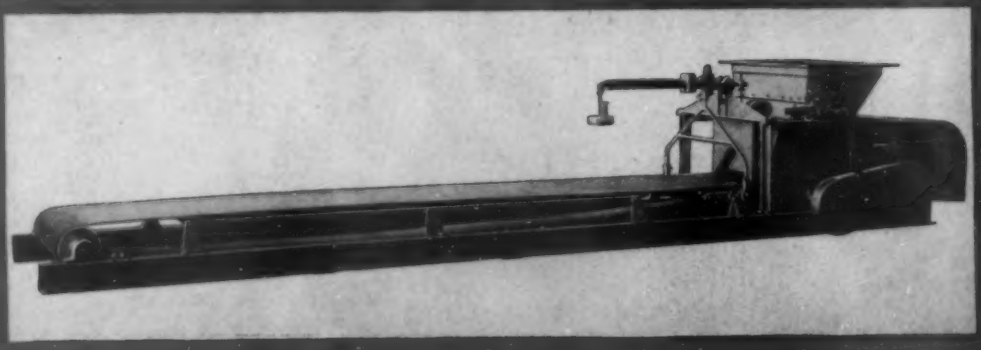
Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

# The Schaffer Poidometer



FEEDS—WEIGHS—CONVEYS

## SPECIAL FEATURES AVAILABLE

**THE NON FLOOD HOPPER**
for use with extra fine materials that have a tendency to flood.

**EXTRA LENGTH**
built into the Poidometer as an integral part —eliminates the necessity of an extra conveyor—obtainable with pulley centers up to 35 feet.

**MAGNETIC PULLEY**
built into the Poidometer at the discharge end for removing tramp iron from coal and other materials.

**MOUNTED ON TRUCKS**
the Poidometer becomes portable and may be moved from bin to bin as the occasion requires.

**AUTOMATIC CONTROL**
used when two or more poidometers are proportioning materials; — automatically stops all Poidometers when material supply fails to any one — and automatically starts all Poidometers when missing material is supplied. This insures constant proportions at all times.

**DUST TIGHT COVERS**
Any Poidometer may be equipped with dust tight covers when necessary.

■ ■ ■

*Write for Catalog No. 2*

**Schaffer Poidometer Co.** 2828 Smallman St. Pittsburgh, Pa.

# Dredging Up... Costs Down with...


# C-B Diesels

Keystone Sand Division of Dravo Corporation wanted *more* high quality sand, gravel and stone from their Dredge No. 9. Additional machinery assured increased production, better quality . . . Cooper-Bessemer Diesels answered their demand for low cost power to drive that machinery!

Now, Dredge No. 9 turns out 400 to 500 tons of materials per hour . . . does it steadily with dependable Diesel-electric power . . . at less cost, thanks to economical Cooper-Bessemer engines. And, Keystone Sand likes the reserve power in those engines.

Two, Type EN, eight-cylinder Diesel engines, rated 210-300 hp at 525-750 rpm, drive Elliott variable speed generators to furnish power aboard Dredge No. 9.

**There's a C-B Diesel to meet and surpass your requirements for trouble-free, low-cost power units . . . 25 to 1280 hp.**

The Cooper-Bessemer Corp.
Mount Vernon, Ohio

Yes, we are interested in lower power costs, and we want your Diesel booklet.

We use approximately_____horsepower.

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Company Name

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City State

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### NEXT MONTH'S ISSUE

In the May issue topics of current interest will be discussed in a number of feature articles. A subject too often overlooked will be covered in an article on fires in cement plants. Belt conveyor transportation used in preference to other modes of conveying is the key to the design of a new sand and gravel plant described. An insight into the operation of a modern rotary lime kiln by a large kraft board plant is offered, together with data from which its efficiency can be compared to commercial plants.

### Gypsum Board

This article describes the entire operations of a large foreign gypsum plaster and board plant. In some respects this plant is similar to modern ones in this country. Of particular interest is the use of an electrical precipitator to collect dust from a rotary drier, the automatic instrumentation to control the calcining process and the method of mixing on the soak belt in the gypsum board plant.

### Stone Sand

Excess stone screenings mean an interest in byproducts which will utilize the surplus profitably. This article concerns the operation of a plant that has found a way to market screenings by mixing them with natural fine sand to produce a stone sand that passes state specifications. The fine sand makes up a deficiency in the finer sieve sizes and is the means of producing a marketable stone sand even though the tonnage of screenings is too low to justify a complete sand plant.

### Concrete Products

One of the articles will feature the manufacture of cored concrete slabs of original design, joists, concrete blocks and other products by a comparatively new concern that has grown rapidly. Another article, on ready-mixed concrete will describe several new types of small batching plants that are typical of operations particularly fitted for limited volume.

### Phosphate

In mining and processing pebble phosphate, the plant described has increased recovery by an original method of under-water screening. Fines are split into fractions, the extremes being recovered by flotation and intermediate sizes by agglomeration and screening.

### Processing Articles

Authoritative articles on the important subjects of cement mill grinding, sand classification and the crushing, sizing, testing and specifying of aggregates will be continued. The third article in the series on grinding investigates the comparative efficiencies of different sizes and shapes of grinding media, mill efficiency as related to speed of rotation, closed-circuit grinding with emphasis on circulating loads, grinding aids, etc. Nettleton discusses laboratory methods used to study the capacity and efficiency of aggregates screening equipment. Classification for the removal of excess coarse and fine fractions of sand is Mr. Shaw's subject.


# ROCK PRODUCTS

**RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD**

**With which has been consolidated the Journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)**

**VOL. 43, No. 4**


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(PUBLISHED MONTHLY AT CHICAGO, ILL., U. S. A.)

Entered as second-class matter, Jan. 20, 1936, at the Chicago, Ill., postoffice under the Act of March 3, 1879.

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## STEDMAN IMPACT-TYPE SINGLE-CAGE DISINTEGRATORS

*for the reduction of* **GRAVEL · LIMESTONE · SLAG** *or* **TRAPROCK**

**1** They will produce thoroughly crushed—cubical shaped particles—free from flats, slivers or sailers.

**2** Crush finer at greater capacity with less power.

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**4** Reduce surplus material of any size to higher quality fine crushed material.

**5** Produce 50% to 100% crushed aggregates—to meet present day demands.

**The STEDMAN IMPACT-TYPE SINGLE CAGE DISINTEGRATOR is a Selective Crusher approved for the reduction of any material between 3" and ¼". Used for primary or secondary crushing depending on the feed and size of product desired.**

**Only one operation required now to produce the CUBICAL PARTICLE SHAPED AGGREGATES that engineers specify for better concrete.**

**Available for capacities between 10 and 225 tons per hour. Horsepower requirements range from 10 to 75.**

**In the past 120 days fourteen (14) of these machines have been sold for installation in one of the principal gravel producing sections of this country. Capacities of these machines will range from 50 to 225 tons per hour.**

***Write for Bulletin No. 506 for further details.***

STEDMAN

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## AND MARFAK DID THIS!

**NOTHING BUT MUD** . . . every day . . . all day. But thanks to Marfak in the track rollers this Caterpillar bulldozer keeps right on the job with no time out for roller troubles.

(*Below*) **WHEEL BEARINGS** and scraper sheaves on this Le Tourneau Scraper are also protected with Marfak. A valuable tip to contractors!

## reports Northwestern Engineering Company

THIS CONTRACTOR had to build a road through a pass 10,000 feet above sea level, out near Dubois, Wyo. Here a tough job was made much tougher by springs and seepage that kept all his equipment working in mud.

To provide a dependable safeguard against time-eating delays and costly mechanical failures he turned to Texaco. Starting with his dragline, every piece of equipment on the job was lubricated with the proper Texaco lubricant.

Today—4 years later, Northwestern Engineering Company's job superintendent says of this Texaco fueled and lubricated job—"excellent results."

More than 2300 warehouses in this country offer you Texaco Lubricants and Texaco Engineering Service. Let us help you better the results you are now getting from your machinery. Prompt deliveries and practical help for the asking.

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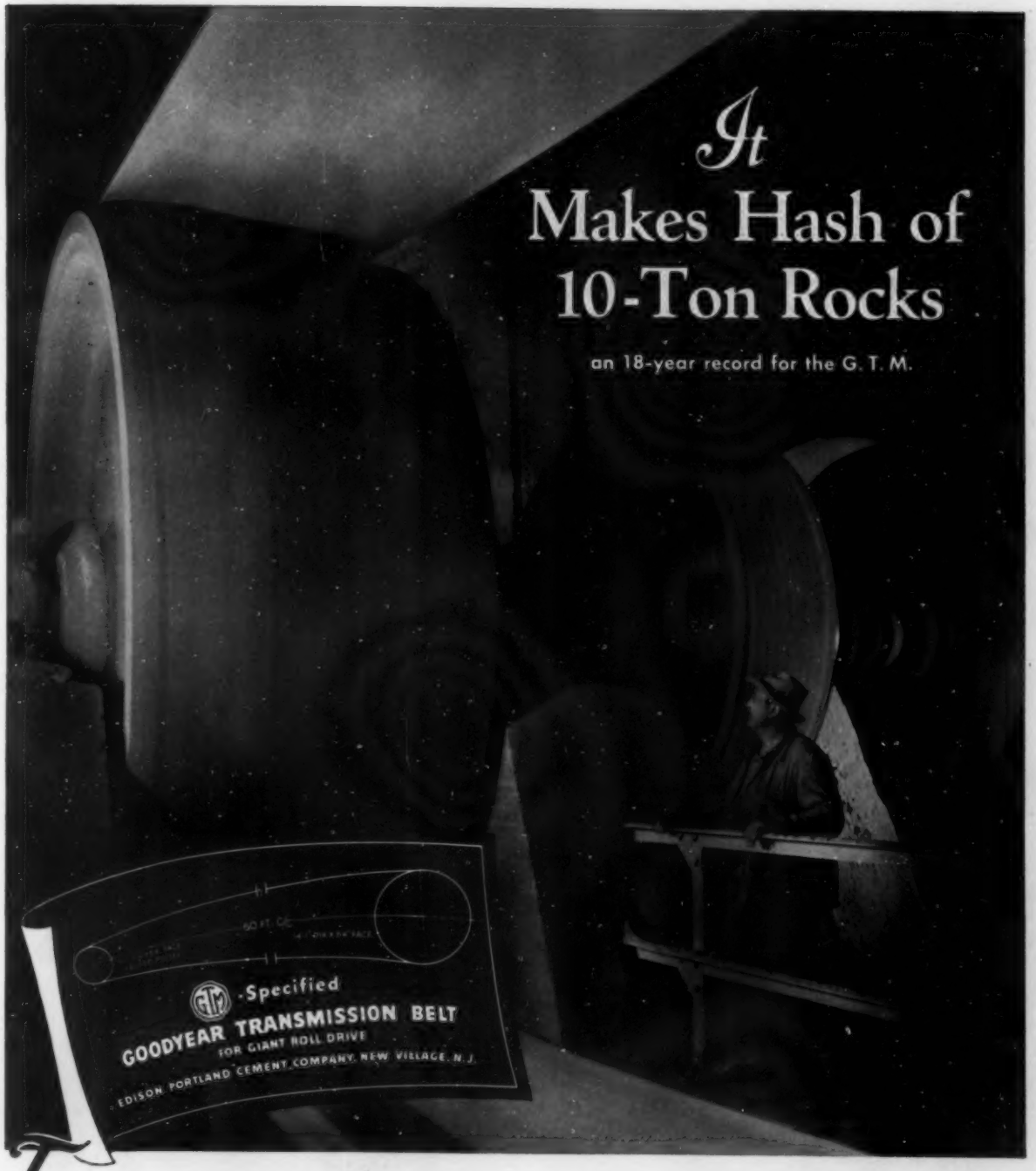
Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

TEXACO

REG. T.M.

## TEXACO Industrial Lubricants




*To make cement, huge limestone boulders weighing up to ten tons are ground to smithereens at the Edison Portland Cement Corporation plant at New Village, New Jersey. The impact is terrific — the strain upon the belt that drives the giant crusher tremendous! To get a belt that could take it the plant called in the G.T.M. — Goodyear Technical Man — just 18 years ago. The belt he specified, a Goodyear 9-ply rubber transmission belt is still pulling this crushing load. Four years' service was once thought remarkable on this belt-killer, but the Goodyear belt has already beat that more than four times over! That is why it pays to consult the G. T. M. — he saves you time and expense by the correct application of rubber to your toughest problems. To bring him to your plant, write Goodyear, Akron, Ohio, or Los Angeles, California — or phone the nearest Goodyear Mechanical Rubber Goods Distributor.*

THE GREATEST NAME IN RUBBER

GOODYEAR

# LIQUOR IMPROVES WITH AGE—

*but that don't go for crushers—*
*for instance, our brand new*

# MULTI-STAGE
## FINE REDUCTION CRUSHER

## HAS EVERYTHING!

—everything that is desirable for profitable fine crushing, with provisions against all of the troubles heretofore experienced in such service. Note these points:—

It is a gyratory crusher of simple and get-at-able design.

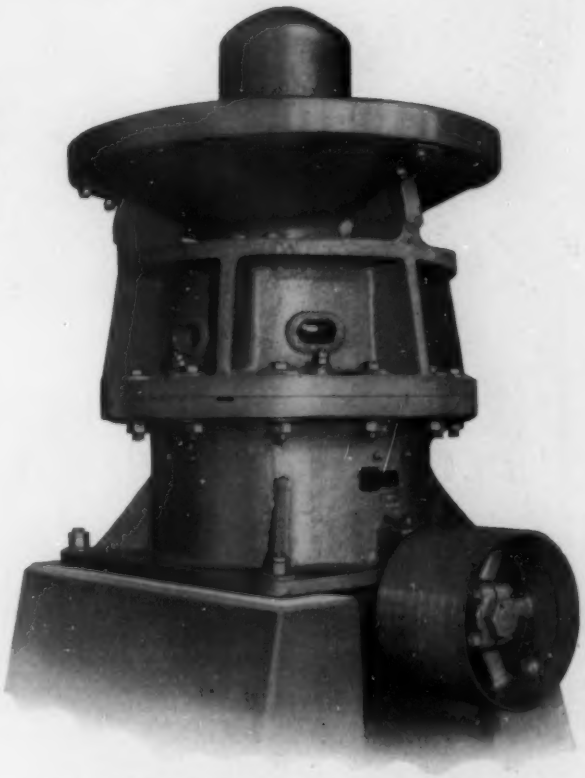
It is non-chokable in either stage, because both are independently adjustable to exactly suit individual requirements.

It delivers more product per horsepower consumed than is usually obtained from reduction crushers.

It discourages any tendency of rock to crush into flats, due to the gradual ratios of reduction, and, by this token, the product is more cubical than usually obtained in making very small sizes.

It has provisions to minimize breakage of parts generally experienced with fine reduction crushers, and to empty the machine in case of sudden power failure.

*See our Bulletin 113 for full details.*
*Yours for the asking.*



*Our Type TY Reduction Crusher (Bulletin 2112), and our Type H Blake Jaw Crusher (Bulletin 1105), should interest you. Send for these bulletins and look them over.*

## TRAYLOR ENGINEERING & MANUFACTURING CO.
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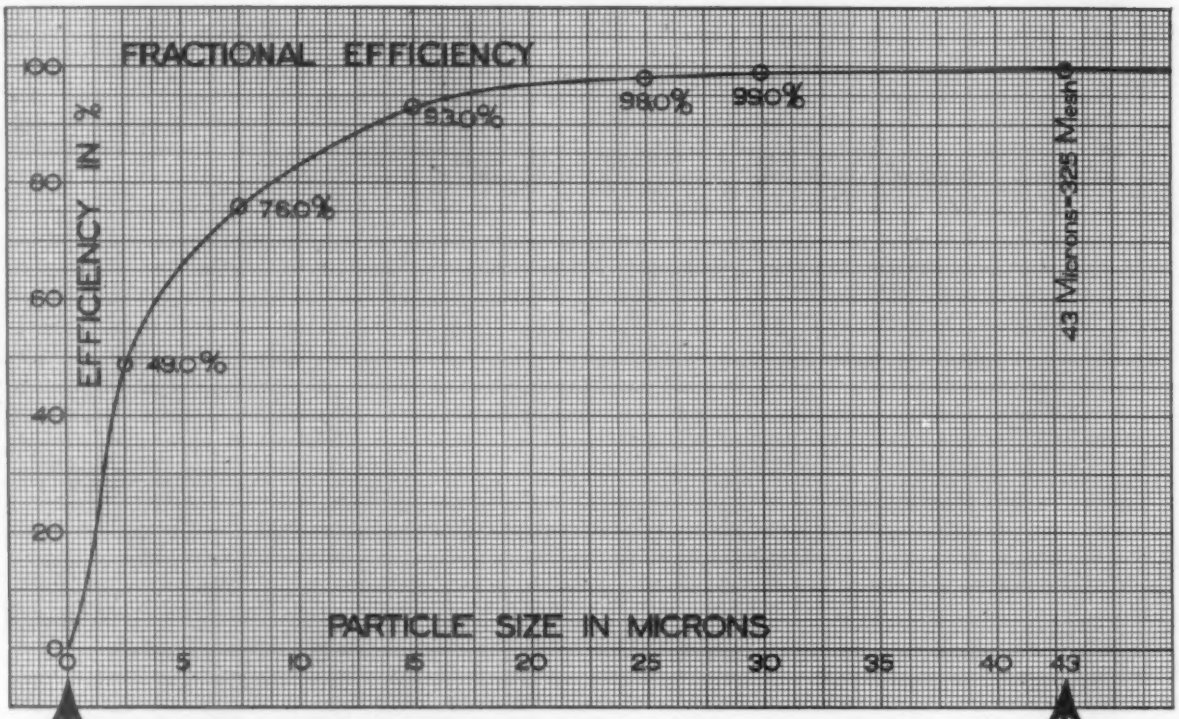
# EVERY DUST COLLECTOR HAS A CHARACTERISTIC EFFICIENCY CURVE




## THIS PART OF THE CURVE DETERMINES OVERALL EFFICIENCY

It's the dust *smaller* than 44 microns—dust that passes through the finest commercial screens—that is hard to collect. Yet "overall efficiency" (a much abused term) cannot be determined until the exact percentage of collection for each particle size between 0 and 43 microns is known.

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The Van Tongeren System used exclusively in Buell equipment offers outstanding advantages in efficiency, low first cost and guaranteed performance. Investigate Buell and save money.

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**LABORATORY BULLETIN**

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# TELSMITH GYRASPHERE

## produces 120 tons per hour of minus 1½" stone!

●Wide experience . . . gained in operating ten quarries in Kentucky . . . has made the Kentucky Stone Company of Louisville very critical of quarry plant equipment.

For their Tyrone Plant* they selected this No. 48 Telsmith Gyrasphere because they wanted to get finer crushing, a wider range of sizes as well as greater tonnage. Are they getting it? *They are.*

120 tons an hour of 1½" and down!

And the Gyrasphere would do better still, if the primary breaker, and the two vertical skips that hoist the rock from where it is mined underground, could dish it up any faster. With its unregulated choke feed this Gyrasphere sure can take it—and handle it—with less trouble, less power and less up-keep.

And why not—it's a rugged, high-speed, super secondary crusher—with every modern feature of design. Spherical head! Double wedge crushing action! Roller thrust bearings! Spring relief! Effective sealing and lubrication! Furnished with interchangeable coarse or fine crushing concaves, you can get the sizes you want—1½" to ⅜", or ⅜" to ⅛". And you'll get better, more cubical aggregate, too. *Bulletin Y-11* tells you why and how. *Get one.*

** Plants at Irvington and at Russellville have also been modernized with Telsmith crushing and screening equipment.*

Y-2-40

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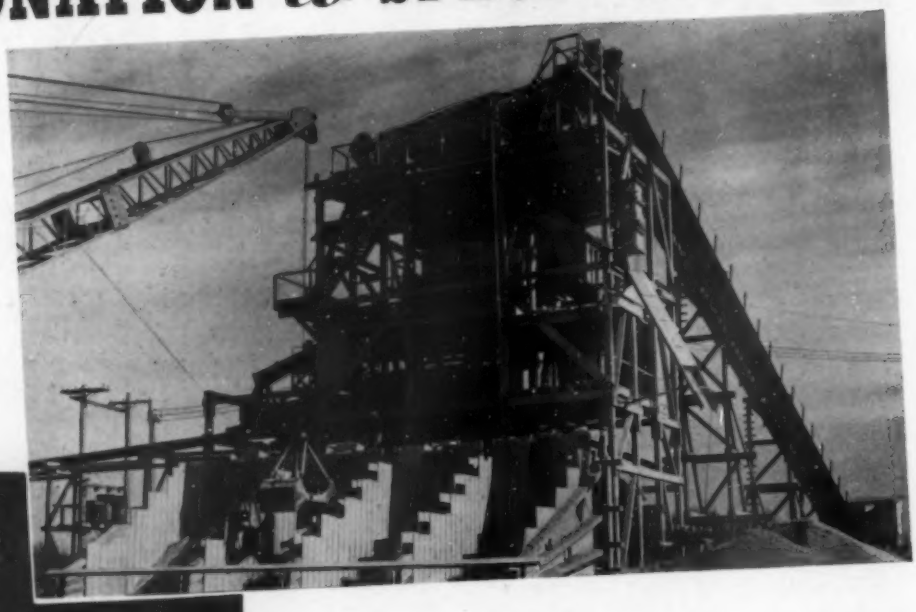
# FRACTIONATION *to* SPECIFICATION

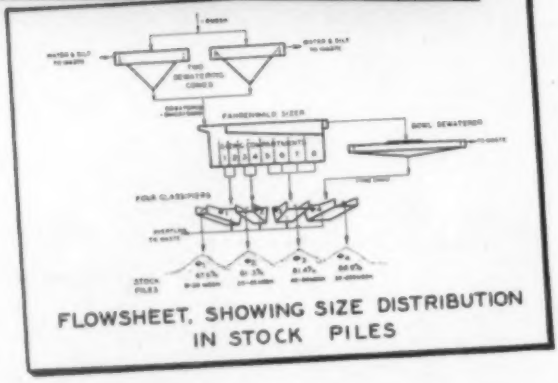
DORRCO



Right: Dorr Sand Fractionation System—capacity, 50 tons an hour.

*for better*

**Asphalt Sand**
**Concrete Sand**
**Silica Sand**
**Special Purpose Sand**



FLOWSHEET, SHOWING SIZE DISTRIBUTION IN STOCK PILES

*We* recently designed the flowsheet and equipped this 50 ton an hour plant for the production of high specification sand. It is a replica in miniature of our big 1000-3000 ton an hour installations at the Boulder, Grand Coulee and Shasta Dams.

Our client's pit was deficient in grains between 40 and 80 mesh and between 80 and 200 mesh. And it was too abundantly supplied with grains in the 8 to 40 mesh range. Yet he must produce a blended product containing these three fractions in certain definite proportions.

The Dorr System illustrated was the answer. First, an eight spigot Fahrenwald Sizer, then a Bowl Dewaterer and finally four Dorr Classifiers. Conventional sand washing equipment ahead. But Dorr fractionation equipment for the more important sizing and blending operations that followed.

Four Dorr Classifiers discharge four sized fractions to four stock piles. These four fractions are then blended together in the correct proportions to give precisely the product specified—in this case, asphalt sand.

● *It will pay you to investigate the Dorr System for making low grade deposits yield top specification sands of all types—concrete, asphalt, silica and specialties.*

## THE DORR COMPANY INC.

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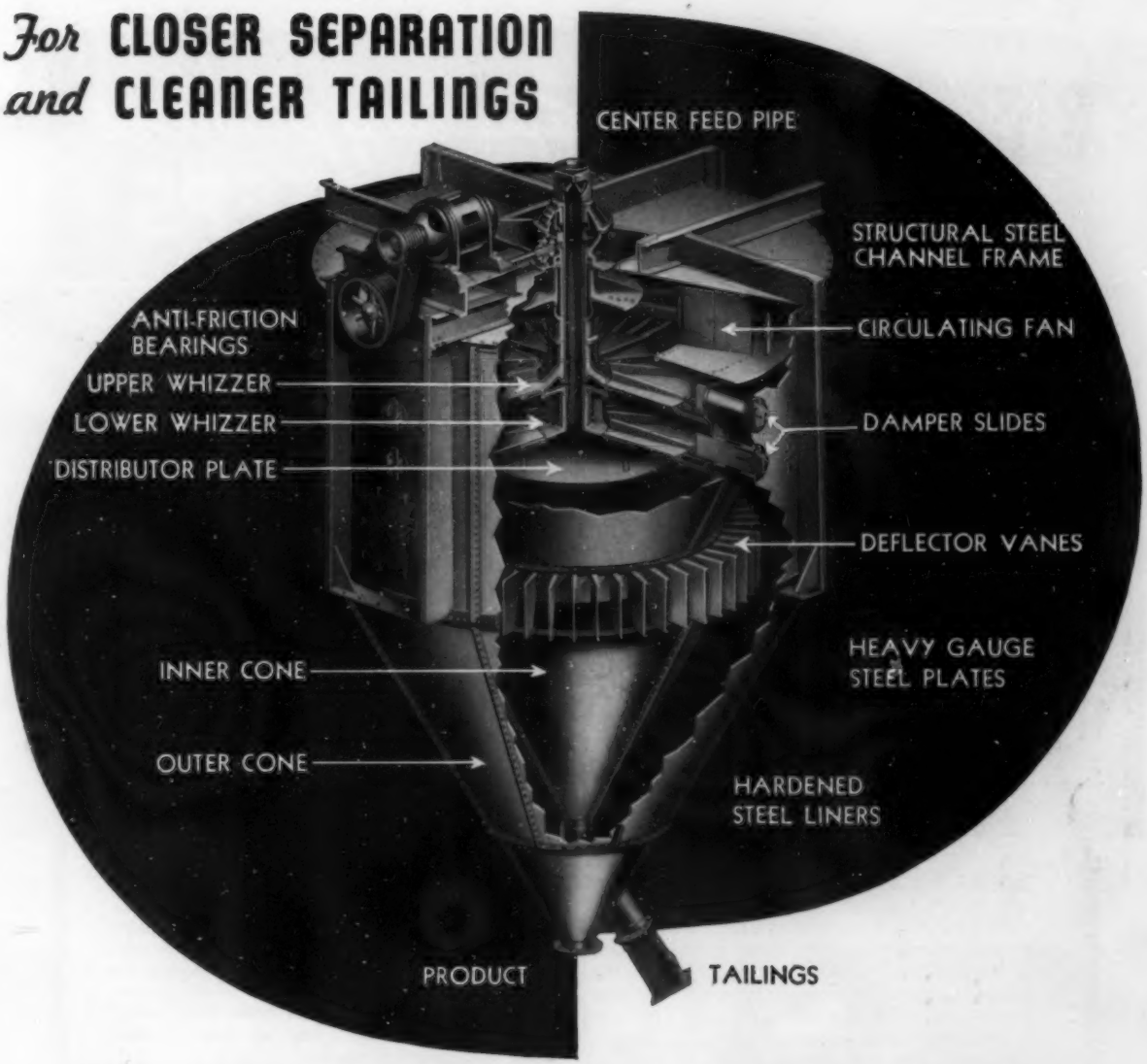
# *For* CLOSER SEPARATION *and* CLEANER TAILINGS




## Raymond DOUBLE WHIZZER Separator

Here is the inside story of the Raymond whizzer-type Mechanical Air Separator . . . and it tells why producers are able to obtain better results from this superior method of classification.

The double whizzer gives still closer control in the selection of particle sizes. It raises the percentage of recovery of the fines . . . increases the uniformity of the product . . . and results in cleaner tailings with a minimum of undersize.

On finished cement, it is easy to meet the most exacting specifications with the double whizzer separator when classifying into various grades, from 1800 to 3300 surface areas, for both standard and high early strength cements.

For the removal of grit in refining clay . . . for classifying fine gypsum plaster . . . for separating sand from silica or other mixtures . . . for separating hydrated lime, and for producing micron materials up to 99.9% through 400-mesh fineness . . . you can get a "clear-cut" separation with the double whizzer unit that is obtainable in no other way.

If you have a difficult separating problem, this double whizzer may be the right answer.

**RAYMOND PULVERIZER DIVISION**
**COMBUSTION ENGINEERING COMPANY, INC.**
1307 North Branch Street CHICAGO
Sales Offices in Principal Cities • • • In Canada: Combustion Engineering Corporation, Ltd., Montreal

# MR. PLANT OPERATOR:

## *Here is what you will get out of this issue of ROCK PRODUCTS*

### If you're in the CEMENT Industry

HOW TO IMPROVE GRINDING is a practical discussion by three cement mill engineers of grinding efficiency and clinker conditioning developed when a cement company had an opportunity to study the subjects with the old equipment and the most modern on the market. It includes operating efficiency with various types of mills, closed circuit vs. open circuit grinding, sizing and gradation of grinding media, etc.

MEASURING DUST COLLECTOR EFFICIENCY is the description of the installation of comparatively new type dust collectors and detailed discussion of sampling methods to determine efficiency. Of particular interest is the method of recovering and blending flue dust and feeding it back into the wet process kilns continuously.

For CHEMISTS—a helpful discussion of the effects of free magnesia on expansion in the autoclave.

### If you're in the CRUSHED STONE Industry

PROBLEM OF ELONGATED PIECES by Elwood Nettleton gives the results of a practical study of particle shapes taken from experience as a plant operator.

SMALL CRUSHING PLANT DESIGNED FOR PEAK DEMANDS describes a small granite plant, showing how to balance production with peak shipping periods and features some operating details that could be more widely used to lower maintenance costs.

### If you're in the SAND and GRAVEL Industry

IMPACT CRUSHER ON MODERNIZED DREDGE and PRODUCING CRUSHED GRAVEL TO OHIO SPECIFICATIONS give you the benefit of two commercial plant operators' experience with the use of two types of impact crushers to improve the quality of crushed gravel aggregates.

Edmund Shaw's article, CLASSIFYING TO IMPROVE SAND GRADING, deals with the correction of sand gradings by adding or subtracting fines, and removing part of the intermediate fractions.

### If you're in the READY MIXED CONCRETE Industry

LARGE PLANT IN CRAMPED SPACE is a description of one of the newest and largest batching plants in the world which will give you many ideas that can be applied to your own plant, whether large or small. One of the outstanding features is the plant accommodations for handling a number of types of cement without excessively large bins.

### If you're in the CONCRETE PRODUCTS Industry

You will get a profitable lesson from the article IF IT'S CONCRETE WE MAKE IT. It is based on the experience of a Southern concrete products concern that has developed business on the sound policy that anything that can be made in concrete should be made.

**Add to all these, the editorials, regular departments, news items, new machinery pages, advertisements of leading equipment manufacturers, and you will have a countless number of new ideas which will mean extra profits for you. The MAY issue will contain still more. Make sure all your key men get a copy personally so they can study it at their leisure. It will pay you well. Special group subscription rates on request.**

## ROCK PRODUCTS

309 West Jackson Blvd.

CHICAGO, ILLINOIS

# *Largest crushing plant in West uses low-cost* "CATERPILLAR" DIESEL POWER

**They don't come too big for "Caterpillar" Diesel Engines!—as this huge Pioneer crushing plant of McNutt Bros., Eugene, Ore., shows. Two D13000 Engines drive primary crusher and 40 x 22 rolls, screen on top of 5-compartment bin and three conveyors. A D17000 Engine drives the 54V plant. Fuel cost, as every one knows, is so low with "Caterpillar" Diesels that the savings from this item alone pile up fast as the days, weeks and months roll by. Yet this isn't the only source of profit these simple, sturdy, dependable engines create:**

- They're compact—readily set up or moved.
- They help to keep operations close to source of raw material and to destination of finished product (keeping hauls short).
- They're durable—"tough"—ruggedly constructed of high-quality materials, and thoroughly protected by dust seals and positive lubrication.
- They require no specially trained attendant—any employee can quickly learn to look after their needs (no delicate adjustments nor frequent check-ups).
- With normal care, they require little maintenance—can keep going twenty-four hours a day for long stretches.
- They incur no long delays or lay-up for repairs or overhaul—being backed by the most complete, widespread and readily available replacement-parts and service facilities of any engines in the world.
- Their long serviceable life (proved by thousands of actual records in every industry) spreads purchase-cost and depreciation write-offs thinly over the years.

• Crushers, screens, washers; compressors for rock-drilling; shovels and bulldozers for removing overburden; cranes for quarrying and loading; tractors and locomotives for hauling—all do their jobs *better, quicker, cheaper* with "Caterpillar" Diesel Power. A COMPLETE RANGE OF ENGINE SIZES—34 to 180 horsepower. See nearest "Caterpillar" dealer, or write direct for free literature.

**CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS**

# CATERPILLAR

DIESEL ENGINES • DIESEL-ELECTRIC SETS
TRACK-TYPE TRACTORS • ROAD MACHINERY

**LIGHT YOUR NIGHT OPERATIONS, POWER YOUR TOOL SHOP**—with one of these new low-priced, small-size "Caterpillar" Diesel-Electric Sets. Simple, complete, compact, self-regulating. No complicated outside control apparatus. 13 to 66 kw. Electricity for as little as 1 cent per kw. hour (depending on average load and local price of Diesel fuel).

# NEW LOW-COST TYPE "R" CRUSHER GIVES YOU MORE MONEY-SAVING FEATURES at Lower Cost!

**EXTRA-VALUE Engineering Advancements of Type "R" Crusher Mean a Better Product . . . Real Money-Saving Performance! Get the Story of the Fast-Selling Crusher that COSTS LESS than Any Comparable Machine on the Market Today!**

IT'S THE TALK of the industry . . . this *new,* low-cost Type "R" Crusher . . . with *new* engineering features that give operators *greater* crushing capacities . . . and save them money at the same time! Here's why . . .

One-piece, self-tightening concave ring assures you finer settings . . . actually produces a more uniform product! Exclusive automatic relief valve passes ordinary tramp iron fast . . . cuts outage time . . . increases safety! Correct coordination of speed, design of crusher chamber and head movement gives you continuous high capacity under crusher buried feed!

### Cleared in 1/10 the Time!

Important, too, you don't waste any time when you want to change settings for a new product! A few simple strokes of an Alemite gun . . . and the oil-filled hydraulic jack does the work for you . . . gives you an exact setting anywhere within the range of the Type "R"!

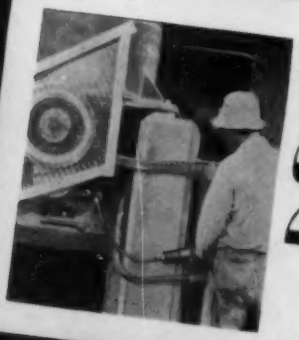
And when it comes to clearing the Type "R" after power interruptions . . . here's a story you'll want to know! A large eastern crushing plant had a power failure. It took two men only 15 minutes to put the Type "R" back in operation — one-tenth the time it took three men to clear an ordinary crusher!

But here's the ***best*** news of all! You can get the new Type "R" Crusher . . . with all its money saving features and engineering advancements . . . at a price that's ***less*** than any comparable machine selling today!

For the whole story on how you can get ***greater*** crushing capacities at a ***lower*** all-around cost . . . call the nearest Allis-Chalmers District Office. Or write for Bulletin B-6006 . . . ***now!*** A-1200


THE ALLIS-CHALMERS LOW-HEAD Vibrating Screen . . . the fastest selling screen on the market today . . . gives you new savings in head room . . . in operating and maintenance costs . . . in improved products. Write for Bulletin 1478-B for full details on how this rugged screen can fit into your plant layout.

**1** HERE'S THE relief device that cuts time-out for clearing tramp iron. It passes common tramp iron *fast . . . automatically!* Adjustment of this valve controls pressure in the crushing chamber!



**2** SIMPLE OPeration of this exclusive hydraulic step support saves time in resetting the Type "R" Crusher for different size products!

**3** POPULAR 322 TYPE "R" CRUSHERS ARE carried in stock . . . ready for delivery without delay . . . ready to cut crushing costs in your plant! Shipment of Type "R" Reduction Crushers completely assembled can be made anywhere!

*Over 90 Years of Engineering Superiority Work for You When You Specify Allis-Chalmers!*

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MILWAUKEE·WISCONSIN

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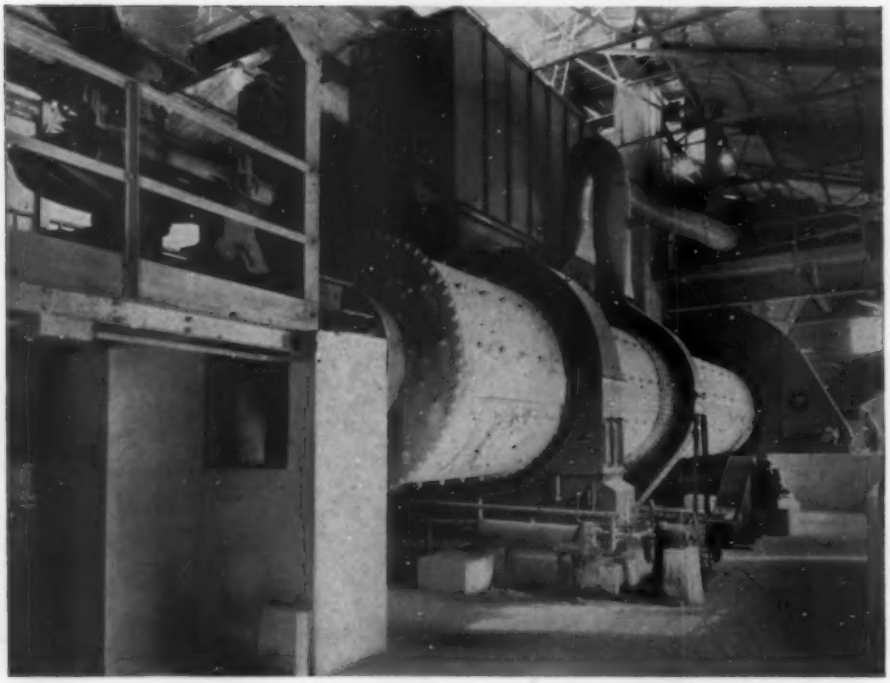
Wet grinding or dry grinding
Open or closed circuit
Gravity discharge or air swept
Combined drying and grinding
Direct firing or bin system



**UNIDAN** multi-compartment mill, combining granulating and pulverizing.
**UNIKOM** multi-compartment mill with overhung preliminary grinding chamber.
**TIRAX** multi-compartment air swept mill for drying, grinding coal, etc.
**ATOX** air swept high speed, vertical shaft mill for drying and grinding.
**KOMINUTER** and **BALLMILL** for granulating. **TUBEMILL** for pulverizing.

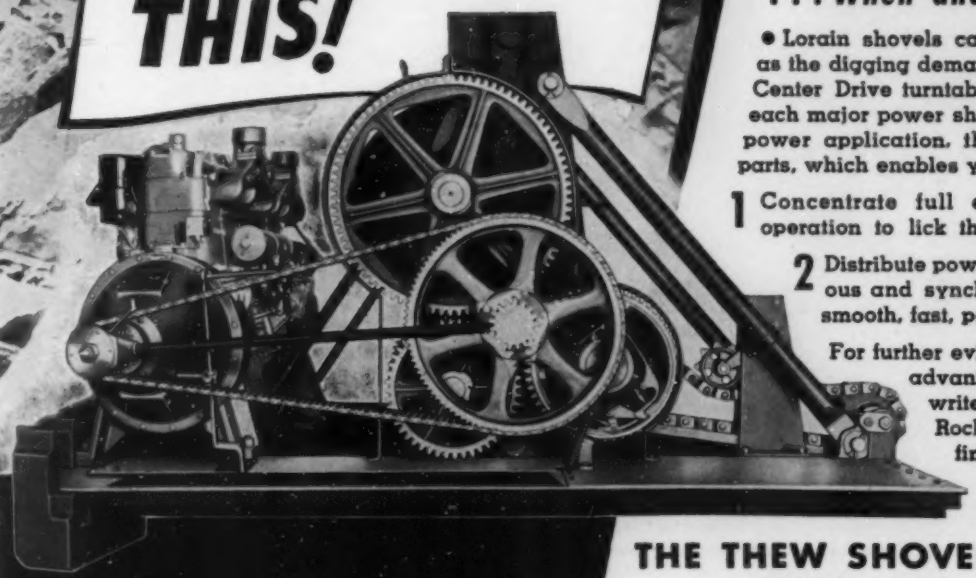
Also a complete line of accessories for the grinding operation such as air separators and classifiers, Trix wet separator, fans, liners, grinding bodies, spray casings, symetro gear boxes, feeders, conveyors, pumps, dust casings, washmills, etc.

## F. L. SMIDTH & CO.

225 BROADWAY — Engineers — NEW YORK, N. Y.

# WHAT IT TAKES TO DO THIS


# COMES FROM THIS!



## Ability To Concentrate Full Power . . . When and Where You Want It

• Lorain shovels can spot or spread their power as the digging demands. That's because their Thew Center Drive turntable offers direct power drive to each major power shaft. It is this direct-to-the-point power application, through the fewest number of parts, which enables you to—

1 Concentrate full engine power on any one operation to lick the toughest going (as above).

2 Distribute power over two or three simultaneous and synchronized operations to obtain smooth, fast, powerful working cycles.

For further evidence of the money-making advantages of Center Drive design, write today for book entitled "The Rocky Road To Success." You'll find facts aplenty to substantiate Lorains' reputation as real rock shovels.

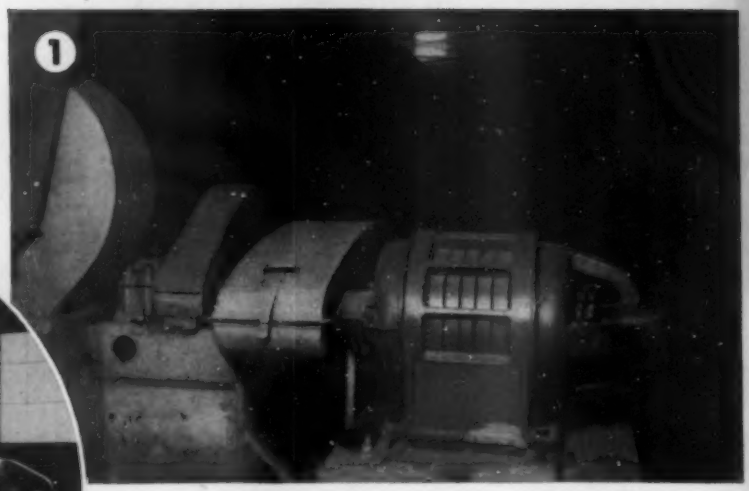
**THE THEW SHOVEL CO.**
LORAIN, OHIO

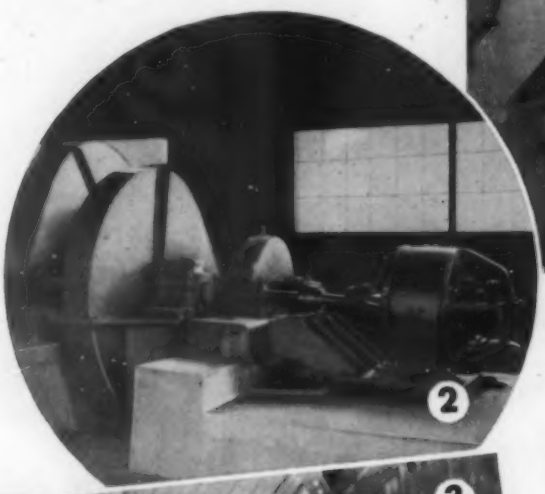
THEW CENTER DRIVE

# LORAINS

# General Electric PRESENTS NOT ONE---NOT TWO--

**1. G-E WOUND-ROTOR (SLIP-RING) MOTORS** are popular throughout the cement industry. They operate on an a-c power supply, they have the high starting torque that is so desirable in a kiln drive, and their speed can be varied over a considerable operating range. Here's one—100 hp, 375/750 rpm—driving one of the four 250-foot kilns in a New York plant



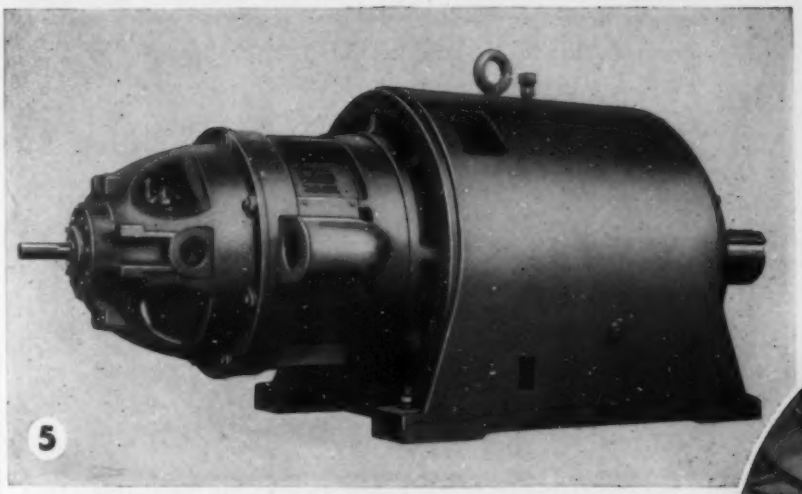

**2. G-E DIRECT-CURRENT MOTORS WITH FIELD CONTROL** give very close speed adjustment over a wide range, have ample starting torque, and can be powered directly from any d-c bus. They are well suited to the modern requirements of a one-kiln plant. Picture shows a G-E Type CD 75-hp, 600/1200-rpm d-c motor driving kiln in a Texas plant

**3. G-E DIRECT-CURRENT DRIVE WITH ADJUSTABLE-GENERATOR-VOLTAGE CONTROL** provides ideal starting conditions and smooth, flexible speed control. This system eliminates the need for special feeder synchronizing equipment. Motors for any kiln and feeder combination are powered and controlled from a separate generator, making the system particularly adaptable to a multi-kiln plant. Here is an installation view showing a G-E d-c kiln motor with direct-geared tachometer generator

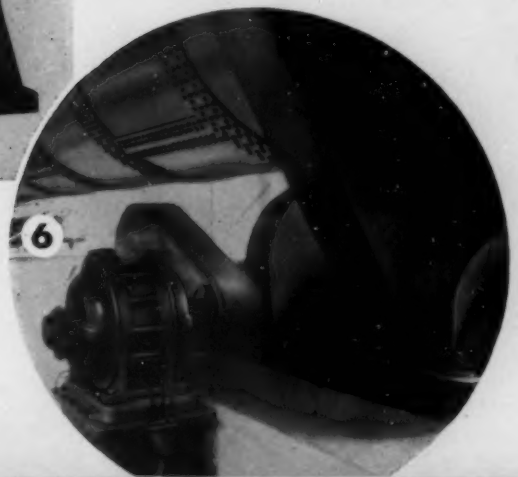

**4. G-E ADJUSTABLE-SPEED, BRUSH-SHIFTING MOTORS** enable you to use alternating-current power and at the same time get the flexible speed control that is usually associated with d-c drive. Here is one of these motors —Type BTA—shown driving a kiln in a modern plant

# But Six---

## Dependable Kiln Drives That Meet ALL Modernization Requirements




HERE they are—six General Electric kiln drives from which you can select the one that fits your modernization requirements best. But you don't have to make the selection unaided. G-E engineers will be glad to work with you and your consulting engineers in studying operating conditions and making recommendations. Just get in touch with our nearest representative. General Electric Co., Schenectady, N. Y.



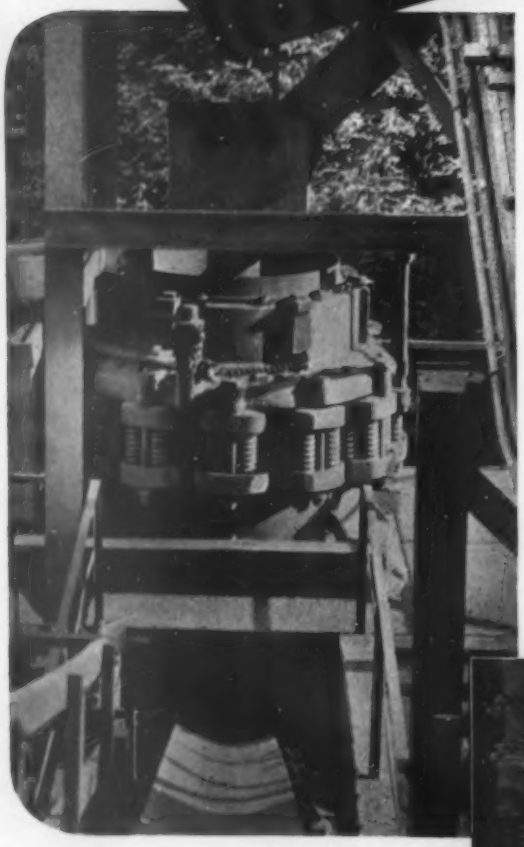

**5. G-E GEAR-MOTOR DRIVE** is attracting the attention of cement-mill men because it saves space, reduces installation costs, contributes to safety of operation, and has the desirable characteristics of a normal-speed drive—all important points to be considered. A continuous oil bath for the gears assures long life of parts, consequently long, low-cost service. This G-E wound-rotor gear-motor was built for an Eastern cement plant

**6. G-E STANDARD SQUIRREL-CAGE MOTORS** have the advantages of low first cost and an exceedingly simple construction that contributes to trouble-free operation. When adjustable speed is not a primary consideration, you can obtain successful service with this type of drive. This picture shows a typical installation. It's a G-E 50-hp induction motor driving a kiln in a Tennessee plant

GENERAL ELECTRIC

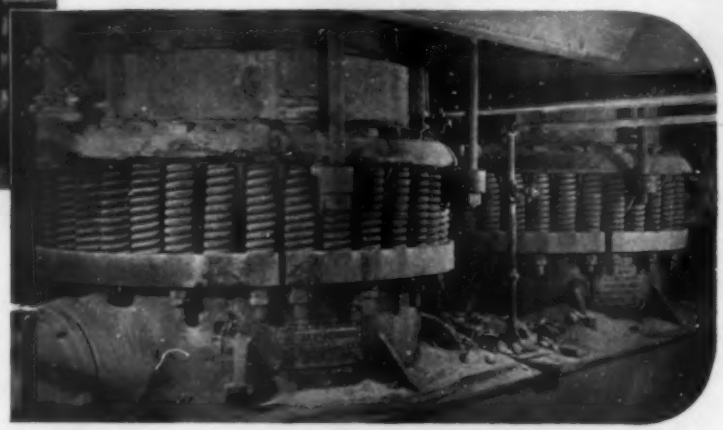
652-1

# SYMONS SHORT HEAD CONE—now supplies that finer sized stone



A four-foot Short Head Cone makes the minus ¾ inch material.

Here is another instance where a Symons Short Head Cone has been added to meet the changing demand for finer crushed material. The two Standard Cones were originally installed to take a 2 to 4 inch feed and make all the finer sizes then required. With an increased use of more material ranging in sizes from minus ¼ inch to minus ¾ inch, the Standard Cones are now only making the ¾ to 1½ inch sizes, while the Short Head Cone is taking the discharge from the Standards and supplying the finer products. The Short Head Cone is arranged to operate independently of the main plant, taking the surplus of any size in storage and readily producing any of the finer sizes for which there is a ready market. This combination of Symons Standard and Short Head Cones permits of greater flexibility and economy of operation and a lower crushing cost, and is the answer to meeting present day demands for the finer sizes of crushed materials.



Two four-foot Standard Cones do the ordinary reduction crushing.

**NORDBERG MFG. CO.** MILWAUKEE WISCONSIN

NEW YORK CITY, 60 E. 42nd St. • LOS ANGELES, Subway Terminal Bldg. • TORONTO, Concourse Bldg. • LONDON, Bush House

# PUT THE BRAKES ON HIGH ROPE COSTS!


Lowest general-average rope operating cost is assured through the use of Roebling "Blue Center" Wire Rope. The result of continuous research and development, this rope is the finest product of Roebling's unexcelled research, steel-making and rope-fabricating facilities. Ask about Roebling's "Blue Center" Wire Rope... either standard or preformed.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
BRANCHES IN PRINCIPAL CITIES

STRONGER—Wire of highest strength consistent with ductility and toughness

TOUGHER—Provides maximum resistance against wear, sudden shocks, vibration

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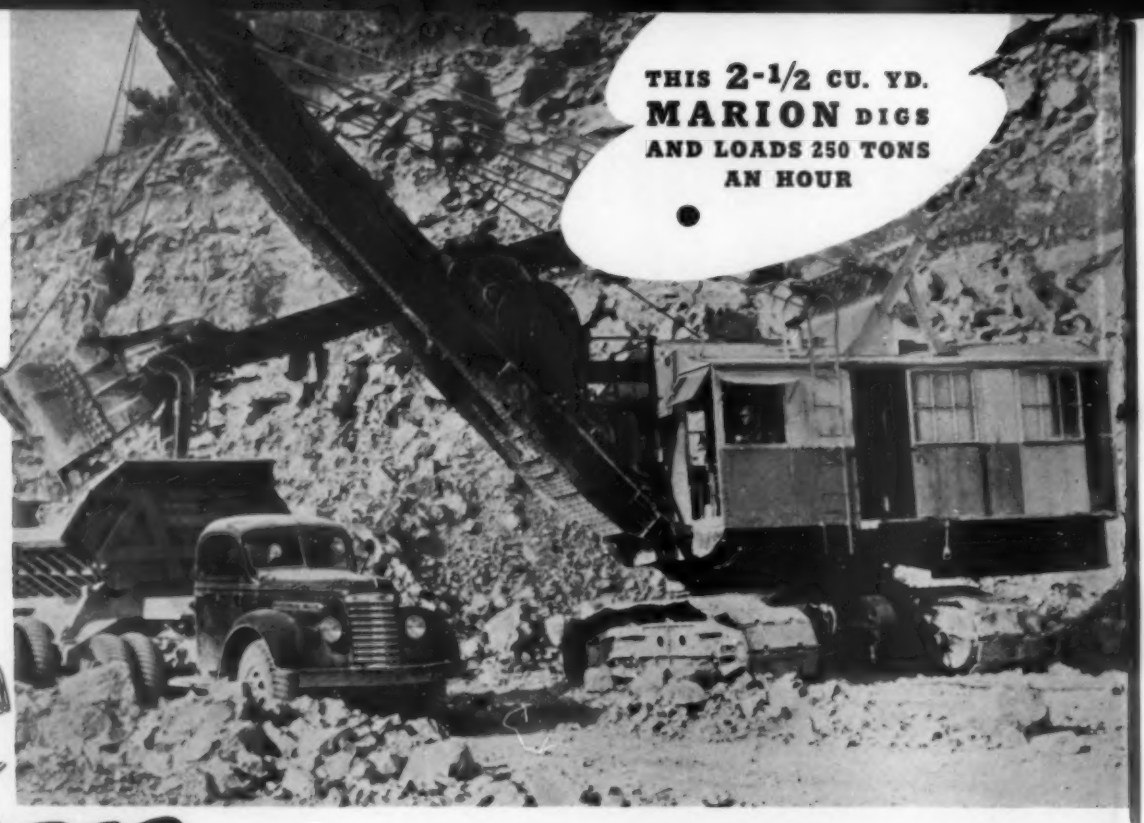
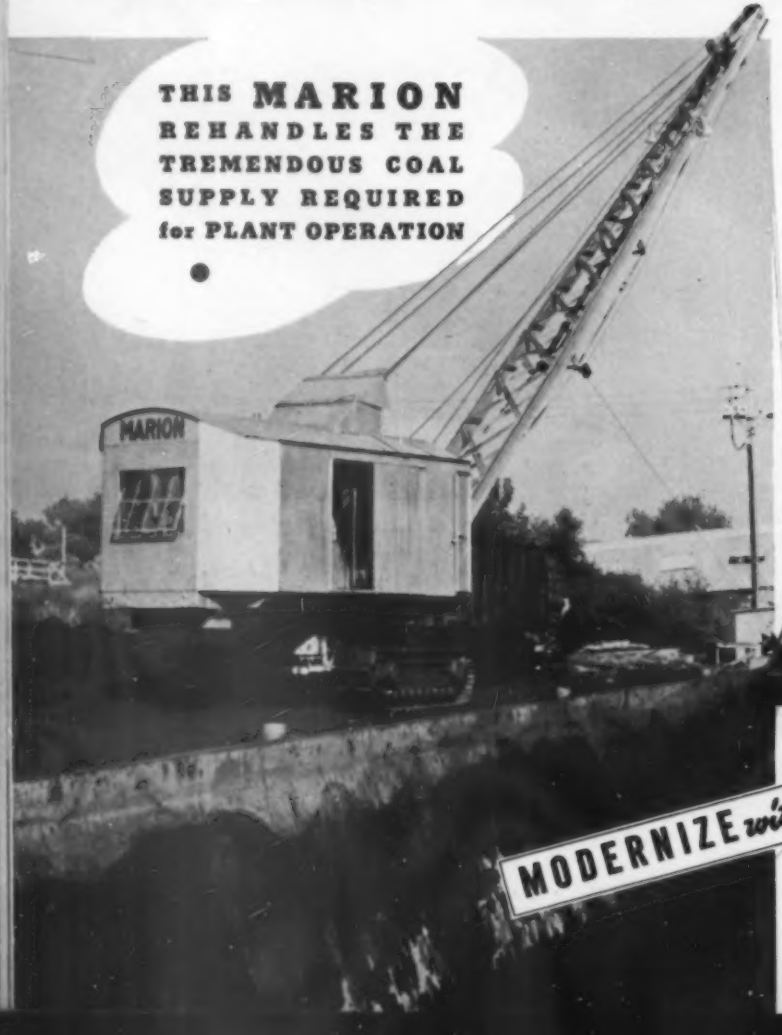
SAVING—Insures lowest general average operating cost

THE HIGHEST DEVELOPMENT IN ROEBLING WIRE ROPE




# IN STEP with the Dewey Portland Cement Co.




## MODERNIZATION PROGRAM

★ Two Marions assure peak efficiency in the handling of materials at the plant of the Dewey Portland Cement Company, Lindwood, Iowa. One Marion loads stone at the rate of 250 tons an hour; the other Marion quickly unloads and handles the entire coal supply for the plant. The adaptability of Marions to the demands of unusual tasks makes them ideal for solving all excavating and construction problems. Your own material handling jobs can be quicker . . . more economical . . . with a Marion. Our engineers will gladly determine the type you need. Write today.

★ Since this advertisement was prepared, the Dewey Portland Cement Company have purchased **another Marion.**

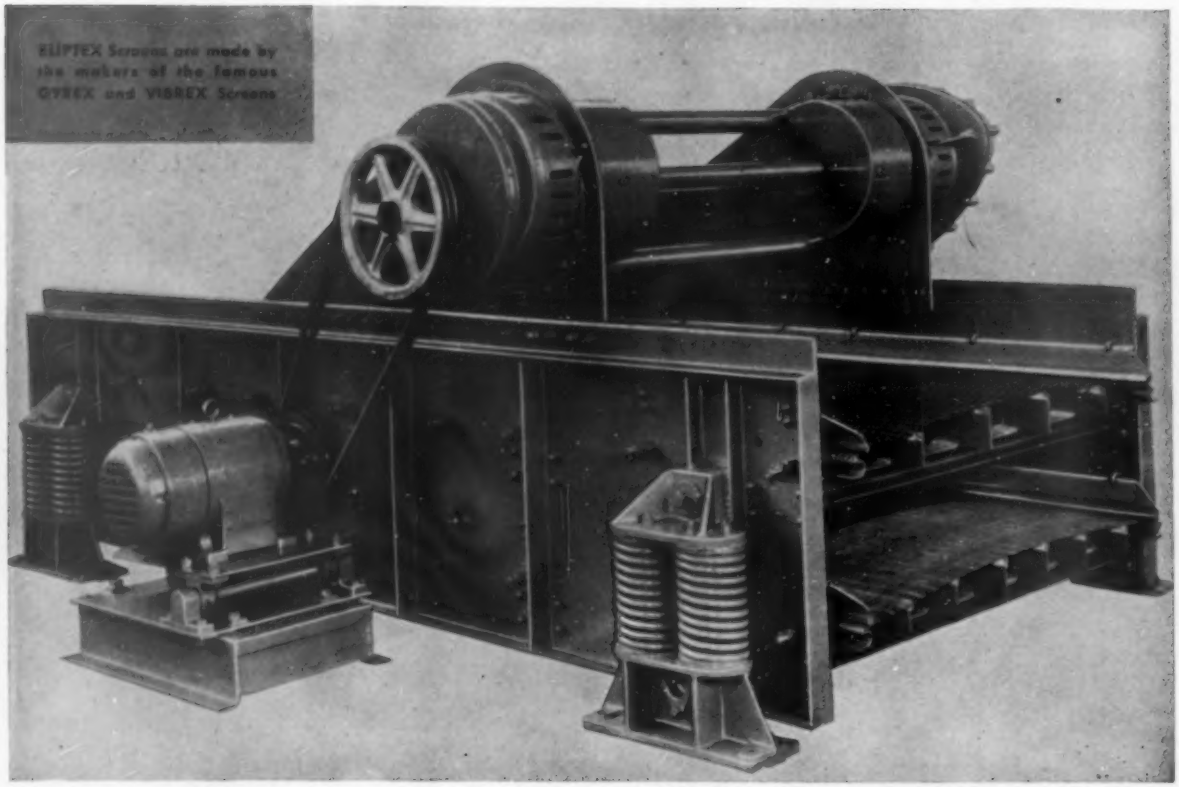
THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

MODERNIZE with

# MARION

SHOVELS • DRAGLINES • CLAMSHELLS
CRANES • PULL-SHOVELS • WALKERS

From 3/4 Cubic Yard to 36 Cubic Yards
GASOLINE • DIESEL • ELECTRIC




*Patent applied for.*

**5′ x 12′ Double Deck Eliptex Screen**

# ELIPTEX SCREEN

## *Closer grading, yet requires less area, less headroom, less power*

**The secret of ROBINS ELIPTEX Screen lies in its unique elliptical motion, uniform throughout. This action propels the material forward, at the same time turning it over and over again, giving each piece countless opportunities to pass through the mesh. Hence a closer sized product.**

**The design of vibrator is such that the screen runs smoothly and quietly, no bounce in starting and stopping. It is strong and simple in construction. Load not carried on bearings, hence long life. Wide range of sizes available in single and multiple decks. Write for full particulars and prices.**

**ROBINS MAKES**

Conveyors, Elevators, Feeders, Hoists, Grab Buckets, Screens, Gates and their accessories.

**ROBINS CONVEYING BELT CO.**
**15 PARK ROW, NEW YORK, N. Y.**
*Offices in principal cities*

MATERIAL HANDLING ROBINS EQUIPMENT


# IS IT A CRIME TO PREVENT INSOLVENCY?

THE Federal Government's investigations and indictments of building material manufacturers, dealers, contractors and trades unions officers is unearthing and exposing to daylight some such obviously corrupt practices that in the interests of the building industry and the public they should be eliminated once and for all—if that can be done. But there have been other cases, not given much prominence, where small groups of rock products producers merely have sought desperately, even if possibly somewhat blindly, to prevent their joint and coincident insolvency.

Practically all rock products plants producing materials of construction are designed to take care of peak demands. These peaks of construction activity are not merely seasonal but run in cycles, which have been known to vary locally by as much as 12 to 1 between years of high and low demand. In other words demand in a low year may be as little as 8 or 10 percent of that of a high year.

Failure to meet a peak demand on the part of local producers, for any length of time—maybe for only a season—is sure to result in the invasion of the market by producers farther away, or the advent of a new producer in the locality. American business men, until fairly recently having been optimists, seem to have expanded production for such peak demands with a simple faith, that "every thing will come out all right."

Now, these industries belong to that small group which requires a very large investment per man employed. The portland cement industry, for example, requires investment of around $25,000 per man employed in the plant. Established commercial crushed stone and gravel plants require per capita investments of perhaps half that. Capital costs, taxes and other *fixed* costs, in general, about equal direct labor costs. But even labor costs do not vary in direct proportion to the volume of output as they do in some more fortunate industries. It takes a certain number of men to man the plant whether it is producing at 100 percent of its capacity or 25 percent.

Unit cost of product is thus very greatly affected by the volume or number of units over which is spread the whole cost. Unit cost at 30 percent capacity may conceivably be almost double cost at 100 percent capacity. Consequently, in times when demand is less than the peak, from one to all the producers in a locality have excess producing capacity and relatively high unit costs. Only two things can happen under such conditions, and in many localities it has been a chronic condition for the past 10 years. In one case producers will cut each other's throats to get volume for themselves at the expense of their competitors, or they will agree (or at least act) not to cut each other's throats, but to live and let live.

The development of price wars is easy for even the uninitiated to follow. A producer gets a large order and his volume goes up and his unit cost down. He can afford to take on more volume at lower prices and still further decrease his unit cost. His competitors' only hope to survive, at least in their opinion, is to take what business they can get at still lower prices. And no one knows what prices are being quoted. So the battle goes on until prices reach an absurd level that would in time bankrupt all the producers.

Such an outcome would not benefit the consumer, or the public; nor would the reduction of the number of competitors by elimination of insolvent producers, since every member of a community suffers from a business failure indirectly if not directly. If there is ever going to be a period of peak demand again it behooves the community to preserve its competitive sources of supply. Moreover, in a persistent price war quality of product is pretty sure to suffer.

The alternative is for the producers to reëstablish a living return from their products. How? Well, that's where the rub comes because so far as we know, and we have consulted experts, there appears to be no way to restore prices except by methods which can be questioned by law-enforcing agencies. Since under our present administration of government every business man is assumed to be guilty until proved to be innocent, the business man who has only self-preservation as a defense receives little consideration and no sympathy or understanding.

What's the answer? Government price-fixing? We do not have any faith in that after watching its application, or rather its attempted application, in the bituminous coal industry. We don't believe any one now knows the answer. But we do believe that business men should be permitted to discuss this problem of price and profit *freely* and *openly*. If they are permitted to do this we have faith that business men can work out their own salvation more intelligently than any one else can work it out for them. If the public interest needs special guarding, let that protection be merely for insurance of a *fair price*, not retention of one that will bankrupt producers.

Nathan C. Rockwood

# Study, Not Play, Makes Executives

## Present shorter work days give more time to build knowledge and character

**Says Charles Warner, in this guest editorial**

Charles Warner, president of the Warner Co., and past-president of the National Lime Association

YOU ARE raising very vital questions and present some interesting aspects on this problem of young men in industry and their proper development to take on the burdens of tomorrow.

My own observations coincide with your criticism—that where managements have been particularly oppressed during the past decade of the depression and have been under pressure to economize, they have not properly developed the younger men who have the training and promise for assuming the responsibilities of tomorrow. I am a strong believer that young men who have ambition and who are willing to adopt an industrious attitude towards the business problems of life should try to find their niche primarily in the fields which most interest them. Some have a bent towards engineering, or chemistry, or other technical phases of a particular business, while some have more interest in business or sales management. Still others prefer to study modern industrial relation problems, and the practice of psychology which deals with human relationships; this latter being so vitally important in our modern management.

The young man of today should try to find his niche in any of these fields and should specialize primarily in the work he gets the greatest "kick" out of. If his ambitions go more broadly into general executive management he should pick up the essential elements of other phases of the business than those he has specialized in, so that when his opportunity comes he is not in a rut in his own field, but has a sufficient background in other fields to qualify for executive advancement.

### TWENTY-FIVE YEARS AS PRESIDENT

**On February 15, Charles Warner celebrated his twenty-fifth anniversary as president of the Warner Company and its predecessor, the Charles Warner Company.**

**In addition to the service he has given to the industry, Mr. Warner has served as a member of the Republican National Committee from Delaware, a member of the Delaware State Highway Commission, and many other civic offices. The most recent honor which has been conferred upon him has been his election to the Board of Directors of the Philadelphia Chamber of Commerce.**

I feel most strongly that the modern executive must have much more training than the average high school course provides. Modern business management has become so highly developed in its specific fields that the executive of tomorrow must get a strong basic education. This usually points towards college, if such is possible. But the time spent in college is a handicap more than a help to many young men, where their bent is too much in the social direction.

This is still a land of opportunity, even for the laborer, provided he has the perseverance and personality to apply himself to study and self-development in his off hours. No matter what their education the young men of today have more opportunity in most lines of work than they ever had before. Because of the shorter working hours of today they have fifteen or twenty hours a week more of leisure time than the youngsters of a generation ago. Whether they start out in the laborer's class or come in with a high degree of education the question is, will they use these opportunities for self-development and to perfect and round out their knowledge and abilities?

My advice to a young man with the proper intention of making the most of himself is to go to college and take up those studies which most interest him. When a young man gets out of college, however, it is of equal importance for him to apply these many surplus hours which modern times have given him for increasing his practical and theoretical knowledge, and for building up his personal position so as to merit advancement in his chosen field.

**Belt conveyor use extended by crushing in gravel pit**

Modern plant of John D. Gregg in California's San Fernando Valley

# Crusher Mounted on Rails to Salvage Boulders

By BROR NORDBERG

BY PLACING the primary crusher on wheels, and arranging for variable speed remote control of crusher run and by-passed material fed from a surge bin to the screening plant, John D. Gregg, Whittier, Calif., closely regulates production of rock, sand and gravel.

These unique methods are used in the modern plant at Roscoe, Calif., in the San Fernando valley where a pit deposit containing 55 percent gravel and boulders is under excavation. Beginning in 1933, when the plant was built, a sucession of additions and improvements have been made which have increased capacity from about 60 tons per hour to its present maximum output of 325 tons an hour.

These additions included more screening surface, new crushers, a larger capacity primary jaw crusher, etc., but the pit changes stand out as rather unusual. The San Fernando valley is one of two large producing areas in Los Angeles county, both of them alluvial in origin, and the deposits are characterized by a heterogeneous mixture from fine sand up to large boulders.

At Roscoe, the pit is being excavated with a 100-ft. face that has a tendency to hang up and cave. A cut of 440-ft. width is being worked by shovel with belt conveyors to handle the material to the crushing and screening plant.

### Rail-Mounted Crusher Increases Capacity

Until 1938, boulders less than 10 in. and all finer material were dumped into a field hopper and conveyed to a 12- x 24-in. primary jaw crusher near the plant. Production was limited to the capacity of this crusher and by its inability to take some of the larger boulders. Conveying boulders wasn't satisfactory, especially on the steep grades out of the pit where they had a tendency to roll. These limitations were removed in 1938, production was increased, and an intermediate surge bin of 800 tons capacity was installed with the necessary controls to regulate the feed of material to the screening plant.

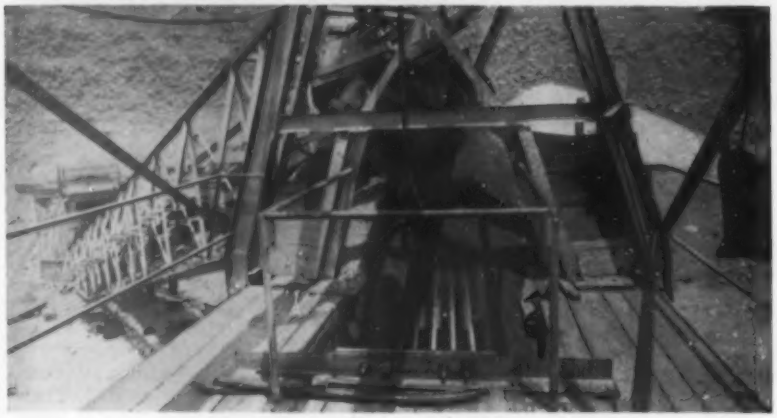
While belt conveyors continue as the means of transportation they are more efficient when operated with a mobile primary crushing unit. This unit is a 28- x 36-in. Traylor jaw crusher mounted on a specially designed and built two-deck steel car with flanged wheels which is hand-propelled on 90 lb. rails spaced 10 ft. apart.

The crusher is fed by an inclined 48-in. belt conveyor, 90-ft. centers, which is pivoted at the head pulley and receives its feed from a field hopper at the bank. By having the conveyor pivoted, from any one position of the crusher car the loading range is in a semi-circle swept by the field hopper—the conveyor having a turning angle of 180 deg.

### Handling Material to Crusher

In preference to blasting the vertical bank, a full-time employe bars, or spuds, down the top of the face, always keeping his cut well in advance of the shovel's activity so that the shovel can work in close to the bank without danger of being covered under when the bank falls. This

Rail-mounted crusher car, showing field hopper conveyor and how belt conveyor is extended beneath the car



**Top: Belt conveyor and crusher car in background. Note how loose material has been spudded down at top of bank**

**Below: Prong grizzley on quarry car by-passes fines which join the crushed product on the belt conveyor**

man has a safety belt and rope which is tied securely on the bank above. His duty involves more than the safety factor since the deposit is stratified and it is desirable to interblend the material at the shovel.

A 1½-cu. yd. Lima electric shovel, with a 35-ft. boom and 24-ft. dipper stick, fills the 25-ton circular steel hopper which has rail grizzly bars on top to reject plus 21-in. boulders. From the hopper a 4- x 6-ft. reciprocating feeder is the means of transfer to the movable, pivoted conveyor. It is driven off the conveyor tail pulley. At the bin outlet counterweighted rails slow the passage of large boulders to prevent shock as they hit the belt in the same way that "tuning-fork" grizzleys are used in other California plants in feeding belts.

Over the crusher is a grizzley with flared openings between the bars having spacings increasing from 3½ in. at the top to 6 in. at the bottom. Split at about 5 in., oversize enters the crusher and minus 4-in. material by-passes to the belt and serves as a cushion, uncrushed and crushed material joining on the 36-in. belt conveyor below the car. This conveyor is horizontal and independent of the crusher car but extends under it parallel to and between the rails. At a transfer point, another 36-in. belt, 425-ft. centers, takes the load and discharges into a 500-ton steel live storage hopper at approximate ground grade.

About once a month it is necessary to move the field hopper, which consists of three sections, one above the other, bolted together. A gathering cable is run through four cable slings fastened to each section and hooked to the dipper teeth when making a move. About four months are needed to work out the area within range of the crusher, and then it is moved forward toward the bank from 70- to 100-ft. In advance of the move, the conveyor is lengthened and track laid. Conveyor sections are 20-ft. channels, bolted together, which are easily moved, and short sections of rail are transferred from one end of the car to the other. Regulation hand-operated car movers are used to re-locate the car. The wheels are clamped together permitting a slight rocking motion. When moving the crusher car, the feed hopper is disconnected and the shovel handles the lower end of the hopper and conveyor truss together.

### Regulate Flow With Remote Control and Surge Bin

About midway from the working face and the plant is the surge bin, which is used to provide a uniform flow of material to the plant or to vary the tonnage arriving at the head of the screening plant.

Gravel, sand and crushed rock flow freely from the tank on to a feeder, which is a 36-in. belt conveyor on 10-ft. centers driven by a Sterling "Speed-Trol" power unit, and from which it is transferred to the main 24-in., 300-ft. centers belt feeding the plant. The power unit is an arrangement of a V-belt drive over two enclosed pulleys, which is capable of adjustment by remote control to

*(Continued on page 40)*

**Left: New-type gyratory reduction crusher and overhead surge bin. Right: Power unit driving belt feeder by remote control to govern the flow of material from surge bin to plant**

# How to Improve Grinding

**Second article in series covers clinker conditioning. Preliminary grinding and pulverizing efficiencies also discussed**

*By C. D. RUGEN, J. A. KIVERT, and R. E. BOEHLER

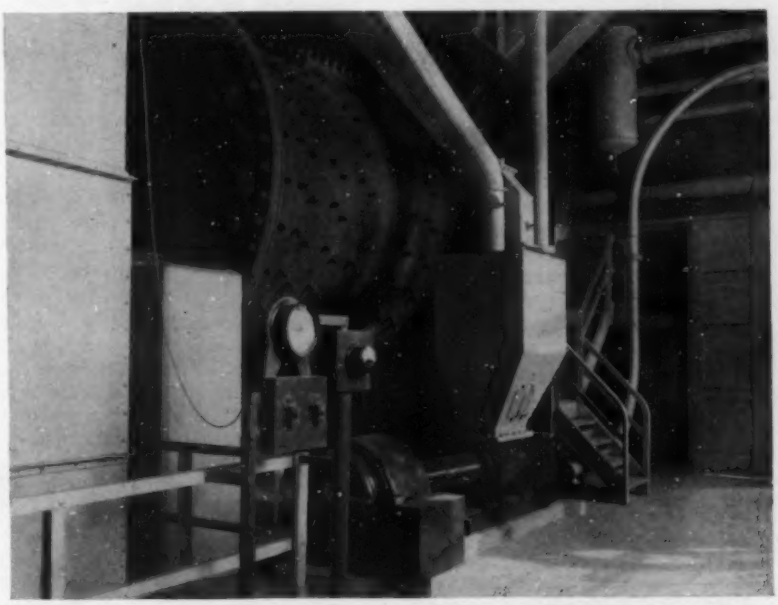
IT IS GENERALLY CONCEDED that the conditioning of clinker has considerable effect on its physical characteristics. The development of air quenching coolers has demonstrated that rapid air cooling of clinker will improve its grindability. There is some controversy regarding the exact temperature range over which clinker should be rapidly cooled to obtain the greatest benefits to grindability.

In general, most investigators agree that quenching should start at as high a temperature as possible after clinker leaves the burning zone and be continued to low enough temperatures to eliminate possibilities of subsequent annealing, although there is some difference of opinion regarding the temperature range in which there will be no further change in crystal structure. The reactions which occur in rotary coolers frequently toughen clinker, and make it much more difficult to grind. Where clinker is discharged directly from kilns into storage, the method of handling in storage considerably affects the rate of cooling and hence, the grindability. Carefully developed methods of handling, which insure maximum exposure of clinker to air are more desirable than storing hot clinker in large piles with only the surface layers subject to air exposure.

The use of water is necessary in some cases to protect elevating or conveying equipment from heat in the clinker, but its use on hot storage piles has been found to toughen the clinker. Inasmuch as temperature in grinding has important effects on mill output, it is desirable that clinker be cooled to the lowest possible temperature preparatory to grinding. It is frequently practicable to develop methods of handling and storing clinker that will improve its grindability, protect its quality, and reduce the overall cost of grinding.

The purpose of crushing and preliminary grinding is to eliminate from tube mill the feed sizes of material which are too large for effective reduction by the tube mill grinding media. Preliminary grinding is usually accomplished in ball, roll, or ring and roller type mills, each of which has its own characteristics. In some cases it is desirabe to crush kiln run clinker in a stage preceding the preliminary mills. Quarried rock always must be crushed in one or more stages before feeding to the above type preliminary mills.

* Engineering Department, Universal Atlas Cement Co., New York, N. Y.



Preliminary ball mill of modern type at Universal Atlas' Hudson, N. Y., mill

### Preliminary Crushing and Grinding

In an investigation of any grinding operation, careful study should be made of the work done in preliminary stages since anything that can be done to improve the character of feed to the fine grinding mills will usually aid the performance of the entire circuit. For example, where hammer mills are used for rock crushing, hammer life may be the primary factor considered in reversing or changing hammers. In some cases more frequent hammer changes may be fully justified from the standpoint of better performance of the subsequent grinding stages, due to the improved character of hammer mill product.

It is desirable to develop as much surface as possible in preliminary grinding to reduce the amount of necessary work that must be done in the less efficient fine grinding stages. Finer feed to the finish grinding mills may permit the use of smaller media in those mills, which, in turn, enables production of more surface. Finer feed likewise tends to flow through a mill more rapidly than a coarse or harsh feed. In some cases, it has been found advantageous to reintroduce into the preliminary ball mill a portion of partially ground product from a subsequent grinding stage to "lubricate" the coarse particles and improve their flow through the mill, hence increasing the total "thruput." In preliminary mills of the ring and roller type, such as Hercules, Griffen, or Huntington mills, finer discharge screens may result in a finer product at no loss in overall output. The limiting factor to capacity of a grinding circuit should be the tonnage of material that can be handled by the finishing units.

Preliminary crushing or grinding may be done in open or closed circuit. In many cases, open circuits will be found as efficient as circuits which use screens or other classification methods for returning the oversize fraction to the mill for regrinding. A grinding mill is sensitive, not only to sizing of feed, but to rate of feed. When an open circuit preliminary mill is close circuited to eliminate larger size fractions from its product, the effect of the circulating load may be sufficient to reduce the grinding action of the mill to such an extent that the average fineness and output of the circuit will be no greater than before.

Clinker grinding mill at the Leeds, Ala., plant of Universal Atlas

It should be mentioned that the best circuit arrangement for a preliminary mill followed by open circuit finish grinding may not be the same as it would be if followed by closed circuit finish grinding. In the former case, it is necessary to eliminate completely from feed to the fine grinding mill all oversize particles that cannot be reduced in one pass through the unit. If finish grinding is close circuited, it may not be necessary to remove all slightly oversize particles from the feed, because occasional oversize passing through the finish unit will be removed in passing through the air separator or classifier and returned for regrinding. So long as these oversize particles may be reduced by repeated passes through the mill and do not tend progressively to build up circulating load, there is no particular advantage in eliminating them from finish mill feed. A number of tests of different clinker grinding installations with closed circuited finishing units resulted in substantially the same overall performance with preliminary ball mills operating in either open or closed circuit. Open circuit operation, therefore, has the advantage of eliminating power and maintenance of the closed circuiting equipment.

### Mill Feeders

It is of importance to provide a uniform flow of feed to obtain uniform grinding action. In open circuit work, feed regulation offers the only means of fineness control. In closed circuit work, this regulation governs the circulating load which in turn affects mill efficiency, capacity and product fineness. The best type of feeder is one that permits variable but positive speed operation with small increments of change. Feed rates once established for maximum performance in a balanced circuit need only be changed to compensate for variations in grindability or to change fineness or specific surface.

Feeders which permit only a few speed changes or are controlled by alternately stopping and starting have the disadvantage of never feeding continuously at the normal grinding rate, which results in at least part of the mill not grinding under optimum conditions. Determination of rate and uniformity of feed to a grinding unit by feeder calibrations or other means is a necessary adjunct to an investigation of a grinding operation.

Energy required for grinding is the all important factor determining mill efficiency. One concept of Rittenger's law is that work done in grinding is proportional to energy input. Energy in this relationship must refer to the useful energy consumed in doing the actual grinding. Such net or useful energy is not ordinarily determined in milling operations, as gross power input which includes all of the energy losses is the item of economic importance to the operator. These losses are appreciable and include motor losses, bearing friction and energy dissipated in heat, wear, and/or waste motion.

It is with the reduction of these losses that the investigator is concerned. Generally speaking, the output (at constant specific surface) of a ball or tube mill, all other conditions being equal, will be more or less directly proportional to gross power input. Certain investigations, however, have indicated that this should not be accepted as a positive fundamental of grinding. For exemple, the ball loading and mill speed that results in the highest output and efficiency for a given unit does not necessarily coincide with the loading and speed which requires the highest power input. The efficiency peak generally will approach the power peak, but it should be recognized that high power input in itself is not the criterion of efficient mill performance.

With many older mill installations, particularly those designed for loading with pebble grinding media, the connected motors are not large enough to operate mills with desired loadings of steel media. Forced ventilation through the windings of the undersized motor frequently can be used to increase the allowable motor load. Older type induction motors may be cooled by installing larger fan blades on the rotor and shroud plates in the end bells to direct the cooling air in and around the motor windings.

Wherever possible, power requirements for grinding operations should be obtained from integrating kw.-hr. meters. Test comparisons based on rated motor horsepower, or occasional check readings with indicating or recording kw. meters may result in erroneous conclusions if the comparisons are desired to indicate performance differences of the order of 5 percent or less. Some mills operating under apparently identical conditions have been found to vary more than this amount in daily integrated average loads. Test runs should always be made sufficiently long to eliminate discrepancies due to errors in short time observations.

*(To be continued)*

# LETTERS TO THE EDITOR

## "Impracticable Gravel Specifications"

THE EDITOR: Referring to the charts which appeared under the title, "Impracticable Gravel Specifications" in ROCK PRODUCTS, March, 1940, pp. 40 and 41, it may be explained that these charts are on our standard form, to be used upside down for fine aggregates, together with extra interpolated lines for special sizes, square holes, etc.

In this connection, it may interest you to know that I took up the problems involved in meeting specifications under the Simplified Practice Recommendations with one of the leading screen manufacturers to get his views. I consider this particular manufacturer among the best in the line with an excellent technical knowledge of screen performance. Here are a few quotations from his letter to me:

"In making No. 3, it is questionable whether the producer would dare to use a screen larger than 1-in. sq. This is on the basis of using a vibrating screen.

"The results we obtain are often very erratic, or appear so, due no doubt to the fact that different materials crush differently, some making cubical products, some more or less slivery and others contain carrot-shaped pieces which are difficult to size.

"The keep the minus 1-in. in No. 3 product down safely below 15 percent the producer must, of course, do considerably better than this; i.e., 10 percent or even 7½ percent."

Note:—I said that 12 percent was the absolute maximum, and 10 percent would be better. My reference is to the actual material shipped. Of course, at the time of actual screening, the percentage would have to be even lower as suggested by this manufacturer, namely, down to 7½ percent.

"A conservatively loaded screen having a deck of 1⅜-in. sq. showed 26 percent minus 1⅜-in. This was crushed limestone."

They refer to the propensity of operators to use a screen of slightly larger size for the last two or three feet of their screen. From our experience, this is very tricky practice and gives erratic results.

"We question whether it is possible to screen through 2-in. sq. and over a 1-in. sq. and obtain a product that will not show over 10 to 12 percent passing a 1-in. screen. To do this successfully would require some juggling of the screen openings. Under ideal conditions, it is sometimes possible, but depends on various factors.

"We do not believe an over-loaded or under-loaded screen will screen as well as one carrying a normal load.

"If the end of the screen shows 20 percent undersize, then to reduce it to 10 percent, we feel that the screen would have to be doubled in length, but simply doubling the length is seldom practical and would not be effective if the load had thinned out so that the screen was not entirely covered. Material traveling over an under-loaded screen is often thrown in the air, resulting in no screening."

I thought the above might be of interest to you.

Very truly yours,
IRVING WARNER,
Vice-president, Warner Co.

## Seasonal Exemption of Sand and Gravel Industry

THE EDITOR: I have read with great interest the editorial appearing in your March issue regarding the dangers inherent in the present trend toward reposing vast discretionary powers in administrative bodies. We all know that in respect to many statutes, the Federal Congress is not able to do more than to fix a legislative policy for the guidance of administrative bodies in the execution of the law. A notable illustration of this necessity is the series of laws in which the Interstate Commerce Commission finds its authority to determine freight rate levels. Obviously the Congress is too unwieldy a body to make an intelligent determination of what are the legal and equitable freight charges for the transportation of all of the products of industry in the United States.

To say this is not to concede that Congress is justified in abdicating its lawmaking functions. I have always felt that the National Industrial Recovery Act was repugnant to the Supreme Court not so much because of the limited powers of the Federal Government over commerce, but because the statute clearly meant that Congress had surrendered to the Executive its constitutional obligation to enact the laws of the United States.

The National Industrial Recovery Act was only one of the several statutes in which the Congress turned over to administrative bodies the task as well as the authority to write the laws by which industry is governed. All of us who have had experience with administrative law know that once an administrative policy is established, it is persisted in irrespective of the merits of the policy and irrespective of the lack of statutory authority for the policy. One always meets the statement by the administrative body that the failure of Congress to adopt a law which sets aside the administrative policy, amounts to an approval by the Congress of the legislative policy in question.

Such a position reflects an amazing change in our political system. Once it was the custom to pass a law and, based upon that law, to write regulations which established administrative policy. Now it is too often the case that the administrative policy is established first and then the law is written either to support the policy or to set the policy aside. I say these things to indicate my agreement with what I believe to be the principle upon which your editorial is based, and having said it, I should like to call attention to one or two phases of the editorial which perhaps do not entirely reflect the actual situation in respect to our seasonal exemption under the Federal Wage and Hour Law.

The effect of the seasonal exemption is that employes of the sand and gravel industry in the exempted zone may be employed for as much as 12 hours daily or 56 hours weekly for 14 work-weeks in the aggregate in any calendar year without payment of the overtime rates which would otherwise apply. This is slightly different from your statement that employes of seasonal industries may be employed for 14 work-weeks without the payment of time and one-half of the minimum rates.

I do not believe that the seasonal exemption provisions of the statute were intended to be a concession to agricultural interests. They were a reflection of Congressional recognition that there were certain industries which had only a limited operating period and which, during that limited operating period, needed to have the right to work beyond the maximum limitations imposed upon those industries which, to some degree at least, found it possible to work the whole year round. The peculiar conditions of the agricultural industries were attempted to be met in Section 7(c) of the statute.

The application of the National Crushed Stone Association for seasonal exemption of the crushed stone industry has not been rejected by the Administrator. It is my understanding that the case for that industry is still under consideration.

V. P. AHEARN,
Executive Secretary,
National Sand and Gravel Association.

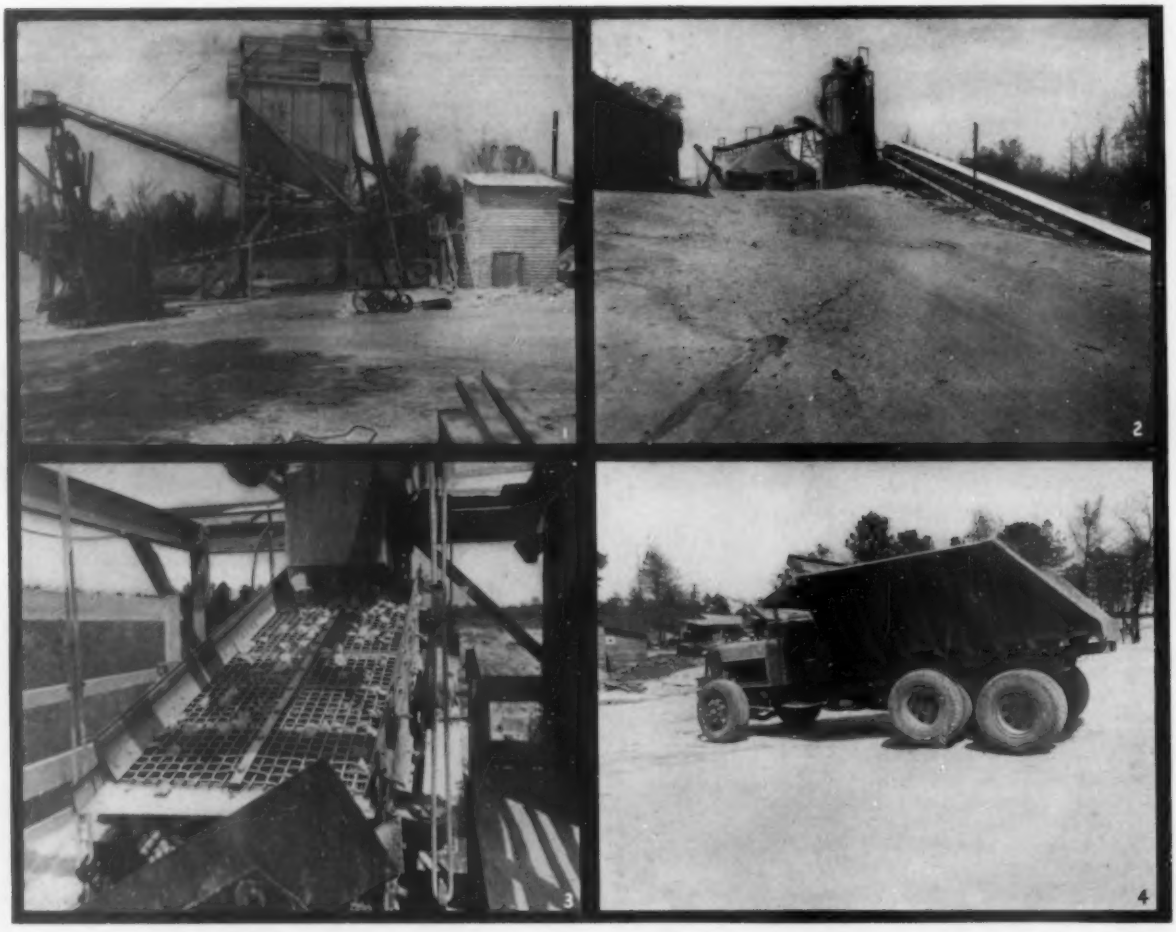


Fig. (1) Surge bin of unusual design to feed sized crushed gravel to stockpiling belt conveyor on left. (2) View of entire plant, showing how belt conveyor from the primary crusher is covered for protection against sun and rain. The screening plant is in the center, with stockpiles visible in the background. (3) Sizing screen, showing feed box to spread stone on the screen at the point of discharge to it. (4) One of the quarry trucks which are of rather large capacity for a plant of this size. They are end-dumping and equipped with double cylinder Wood hydraulic dump mechanisms. Average haul is 500 to 600 ft. one way, up-hill and loaded all the way, with two steep grades. The trucks have 125-hp. Cummins Diesel engines, which are proving economical despite the short haul. Each truck uses an average of 6 gal. of fuel per 10 hr. day, according to a test run for a period of 90 days. This compares with 20 gal. of gasoline used by the older trucks, with a price advantage in the ratio of 8c to 20c per gal. Fig. (5) View of the quarry floor as it appears from the primary crusher. The levelness and maintenance of a clean floor contribute to low truck maintenance. (6) Large jaw crusher, which has an over-capacity to take large stone, permitting close setting and reducing the work of secondary crushing

# Small Crushing Plant Designed for Peak Demands

**Operating details to assure continuous operation and low maintenance expense were considered in planning this granite crushing plant**

By BROR NORDBERG

IN REDESIGNING the granite crushing plant of Stockbridge Stone Co., Stockbridge, Ga., early in 1939, it was decided to take out many of the operating "bugs" which are common to the production of crushed stone.

Capacity of the plant is only 600 tons in 10 hours but loading out capacity into railroad cars is three or four times that amount. Live storage capacity in stockpiles is therefore relatively great for a plant this size.

Plant equipment consists of a primary crushing unit, a screening and reduction crusher unit and an overhead stockpiling belt conveyor, with a reclaiming tunnel conveyor beneath the stockpiles. Stone, from the time it is dumped into the primary crusher, proceeds in a straight line through the several production stages until it is loaded into cars.

### Over-Capacity in All Units Steps Up Efficiency

Practically every manufacturing unit has an over-capacity and connected electric motors are capable of twice the power output actually used. All this was done to cut out overloads and losses in efficiency. The primary crusher, for example, is a 48- x 36-in. Farrel-Bacon jaw crusher, which has greater capacity than needed. Stone that may be picked up by a 2-cu. yd. shovel bucket in the quarry does not hang up nearly so often as it would with a smaller jaw opening. The added capacity is also effective in reducing the amount of secondary crushing needed. A 200-hp. motor drives the crusher through a flat belt.

This crusher discharges on to a 30-in. belt conveyor, 150-ft. centers, which carries the stone to the secondary crusher. The belt is protected from rain and sun by a galvanized iron, A-shaped roof which extends about one foot beyond each side of the belt.

Secondary crushing is done through a 4-ft. Symons cone crusher having a fine bowl and driven through flat belt by a 150-hp. motor. The crusher discharge is carried by a belt bucket elevator, 60-ft. centers, to the sizing screen, which is a double-deck 4- x 10-ft. Niagara vibrating screen. The elevator discharge enters a steel trap, as shown. This protects the screen from shock and serves to spread the feed over the width of the screen.

### Bin of Unusual Design Regulates Flow to Stockpiles

Oversize stone, normally plus 2-in., chutes directly back to the Symons crusher and is then returned to the screen. Below the screening floor is a partitioned steel bin of unusual design which receives the various grades of stone and is the means of transferring them to stockpiles. This bin is not a regulation storage bin, but has just sufficient capacity to serve as a means of regulating the flow of one grade or another of stone direct to the stockpiles.

The stockpiling area is very close to the plant, necessitating a belt conveyor with an angle of elevation of 22 deg. to transfer stone from the bin to the horizontal, tripper-equipped belt extending over the stockpiling area. Accordingly, the hoppered bottom of the bin is tapered at the same angle, parallel to the belt for convenience in placing stone on the belt.

Dust (¼-in. minus) is not one of the regular grades and is handled differently. It flows by gravity through a spout from its bin compartment either directly into trucks, if desired, through another spout for stockpiling or is loaded directly to the tunnel belt conveyor beneath the stockpiles.

The stockpiling belt is 18 in. wide on 225-ft. centers, and the reclaiming belt is 24-in. wide on 265-ft. centers. Normally, three separate piles of stone are kept in stock with reclaiming outlet gates spaced 10 ft. apart. Around the stockpiling area has been built an attractive stone retaining wall that prevents unsightly spreading of the stockpiles and keeps the plant neat.

The reclaiming belt transfers stone to a cross-belt conveyor which discharges stone over a 3- x 5-ft. single-deck vibrating screen over the tracks of the Southern main line. The screen has ¼-in. perforated plate cloth and is used for washing stone at the point of loading either into cars or trucks. Water and dirt are drained off by gravity through an enclosed pipe.

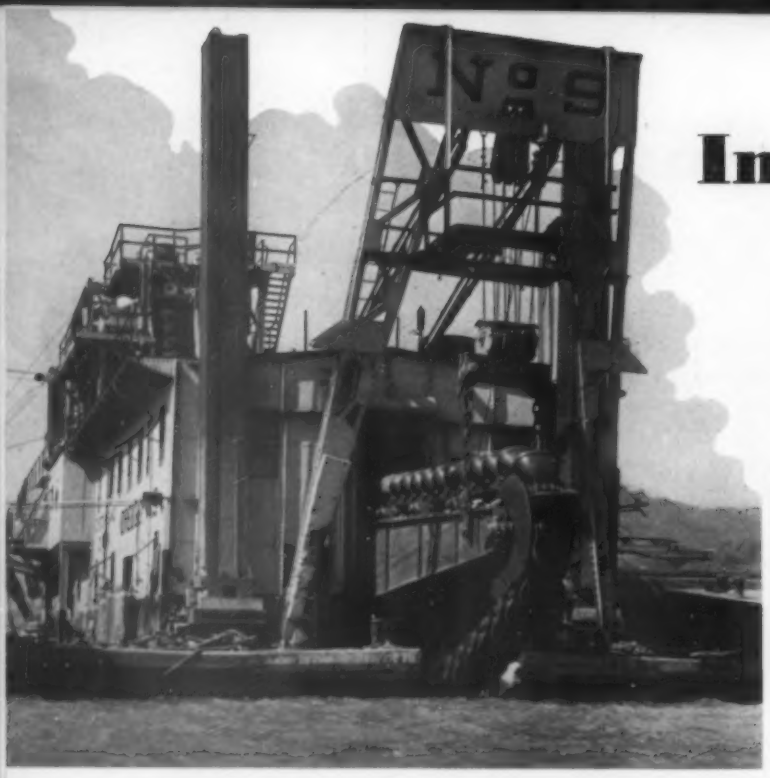
A 50-ft. face is being worked in the quarry. In primary drilling, a Sanderson cyclone drill is used to sink 5⅝-in. holes which are loaded with a 60 percent gelatin dynamite. Secondary drilling is done by jackhammers, the holes being shot with a 40 percent dynamite.

A 2-cu. yd. Marion electric shovel loads the stone into Hug trucks which handle 12 to 14-ton loads to the primary crusher.

Large stockpiles are filled by an overhead belt conveyor and crushed granite is reclaimed through the tunnel shown for high-speed loading of carriers

# Impact Crusher on

**Two 200 kw. Diesel generator sets provide electrical power for individual drives on all new equipment**




Digger No. 9 as it appears with digging ladder in raised position

ONE OF THE MOST COMPLETE floating aggregates plants in the country now in operation is the ladder dredge No. 9 of the Dravo Corp., Keystone Sand Division, Pittsburgh, Penn., which was modernized in the summer of 1939. The dredge, originally constructed in 1929, was rebuilt to improve the quality of the aggregates, to recover more fines in the sand, and to produce a crushed gravel for the first time.

Along with the production of crushed gravel, a substantial percentage of crushed particles is now blended with uncrushed washed gravel as a regular part of the operation. A new type impact crusher was adopted for crushing gravel after a six month's study of the machine's performance in a pilot plant by company engineers to satisfy themselves that the impact crushing principle would produce desired particle shapes, low in flats and elongated pieces.

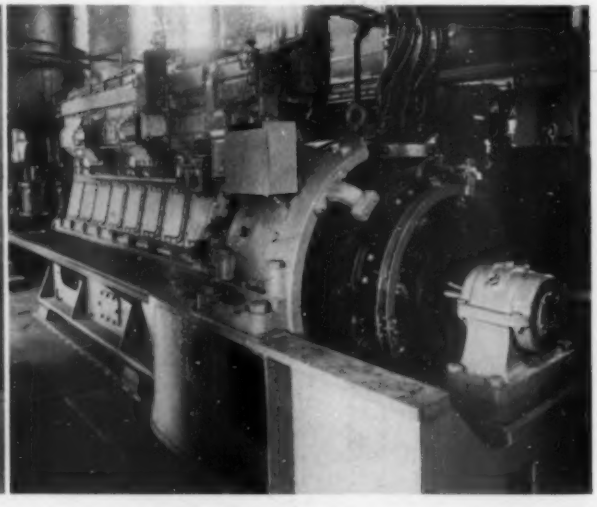
### Large Capacity Scrubbers

Scrubbers of large capacity were installed on the dredge to more thoroughly clean the gravel of all coatings or films of foreign matter. Normally, one of the two scrubbing units is sufficient, but with both running, trial runs have proved that a clean product can be produced even when operating in parts of the river known to contain large quantities of heavy, blue clay and hitherto unworked. This is one of few floating plants that have been equipped with an over capacity of scrubbing equipment, some of which is idle much of the time, but which provides insurance that a clean product can be produced under all conditions to be met.

### Enlarge Dredge Boat to Accommodate New Equipment

Other equipment installed on the dredge includes: a new vibrating scalping screen, five new vibrating sizing screens, four belt conveyors, and chutes and hoppers necessary for classification and blending. Prior to the rebuilding program, a 125-hp.

Impact type crusher, showing chute from which gravel is fed. Baffles in chute adjust falling height. Wear on hammers is reduced by reversing direction of rotation



One of two identical Diesel-electric power generating units on dredge which furnish energy to operate all the sand and gravel processing equipment

# Modernized Dredge

By BROR NORDBERG


Side view taken from gravel barge. In center is the Allswede scrubber; on the left, the Hardinge scrubber, and on extreme right is the Pennsylvania crusher, and above is the Allis-Chalmers scalping screen

steam engine powered all the equipment but now has been supplemented by two 200 kw. Diesel-generator sets with individual motor drives for all of the new equipment. Elevating, digging and auxiliary equipment are still steam-driven.

Greater displacement and increased deck area needed to accommodate the added equipment, was provided by enlarging the steel hull. Extensive alterations were also made on the super-structure to conform with the need for more equipment. Overall length of the hull was increased 12 ft. 6 in., and overall width 12 ft. The dredge now measures 158 ft. by 50 ft. by 6 ft. 9 in. This work was done on the marine ways of the Dravo Corp., Engineering Works Division, at Neville Island, Pittsburgh.

At present the dredge is operating below the junction of the Ohio and Beaver Rivers near Rochester, Penn., some 30 miles out of Pittsburgh. Digging capacity is about 350 tons per hour, of which 80 to 90 tons per hour goes to the crusher. This figure includes some re-circulating load.

### Plant Operation

From the river bed 29 to 30 buckets per minute are elevated to discharge over a 4- x 8-ft. Allis-Chalmers vibrating scalping screen. The buckets of manganese steel, hold 4 cu. ft. each. The specially built scalper is a "low-head" type of screen which ordinarily operates horizontally, but it is sloped about 15 deg.

At the scalper, plus 5-in. gravel is wasted and the remainder flows into a sump from which a bucket elevator raises it to the screening plant. Wasted material at present location is only a small percentage of the total. Elevated material is put over a 6- x 14-ft. Allis-Chalmers horizontal double-deck, roughing screen. Openings on the top deck, normally 1¼- or 1½-in. square, determine the size feed that eventually reaches the crusher. Likewise the bottom deck throughs, normally minus ⅜-in. square openings, are the feed for the sand screens.

The sand screens, two 5- x 12-ft. Allis-Chalmers double-deck vibrating screens, make three gradations—fine, grits and shot. Usually the top deck is of ¼-in. square openings, occasionally 5/16-in., and the oversize is either wasted or loaded by belt conveyor into a barge through a gate which regulates the mixture of shot and grits. With ⅛-in. sq. openings on the lower deck, the ⅛- to ¼-in. material can go one of three ways. It can be loaded out to a barge over the same belt carrying shot in any given mixture with the shot or sand, it may join the screen throughs in the sand tank below when producing concrete sand or go to a waste chute. Sand is settled in an ordinary sand tank and elevated by a dewatering bucket elevator to discharge through a sand chute into a barge.

### Producing Two Grades of Unerushed Gravel

Finished uncrushed gravel is produced from the product retained between the decks of the separating screen. This material, ordinarily about ⅜- to 1¼-in., can go direct to a 5- x 12-ft. Allis-Chalmers low-head vibrating sizing screen, but ordinarily is first put through a scrubber before sizing. The scrubber is a 6- x 20-ft. Allswede 4-compartment revolving drum with a loading of six tons of 4½-in. diameter forged steel balls. Turning at 14 r.p.m. and with the addition of a 1¼-in. stream of water, some grinding in addition to scrubbing action takes place within the scrubber to insure the breaking down of clay balls and the crushing of soft pebbles. Two gradations of uncrushed gravel are produced over the gravel screen, and these are proportioned to belt conveyors for direct barge loading.

### Operation of Impact Crusher

Oversize from the separating screen is the feed to the crusher. Unless the dredge is operating in heavy clay or large size uncrushed gravel is being produced, oversize from the separating screen by-passes a second scrubber on to a cobble belt conveyor which elevates it to the crusher. This second scrubber, a Hardinge machine, turning 24 r.p.m., has a 7-ft. diameter by 48-in. scrubber section followed by a dewatering section. In this scrubber the large size cobbles act as grinding media. At times, gravel from the separating screen which is to be crushed, is put through the scrubber and then over the belt. Coming off the head of the belt it either enters the crusher or joins the stream from the Allswede scrubber on the grading screen. Oversize from the lower deck of the separating screen can also be loaded on to the cobble conveyor to be crushed into chips.

The crusher is a Pennsylvania C-7-38 Impactor which operates somewhat on the order of a hammer mill but throws the gravel against breaker plates to accomplish the reduction.

Speed of rotation is governed by the loading and the degree of reduction desired. Driven by a 100-hp. d.c. motor through a shock-absorbing Falk flexible coupling, the crusher can be operated at any speed between 300 and 900 r.p.m.—the higher speeds for finer products.

As the direction of rotation of the hammers is reversible, breaker plates are provided at each end and there are no grate bars to obstruct the discharge of the crushed gravel. Hammers are of manganese steel, and the breaking plates are 7¼- x 4- x 37-in. blocks of high nickel iron.

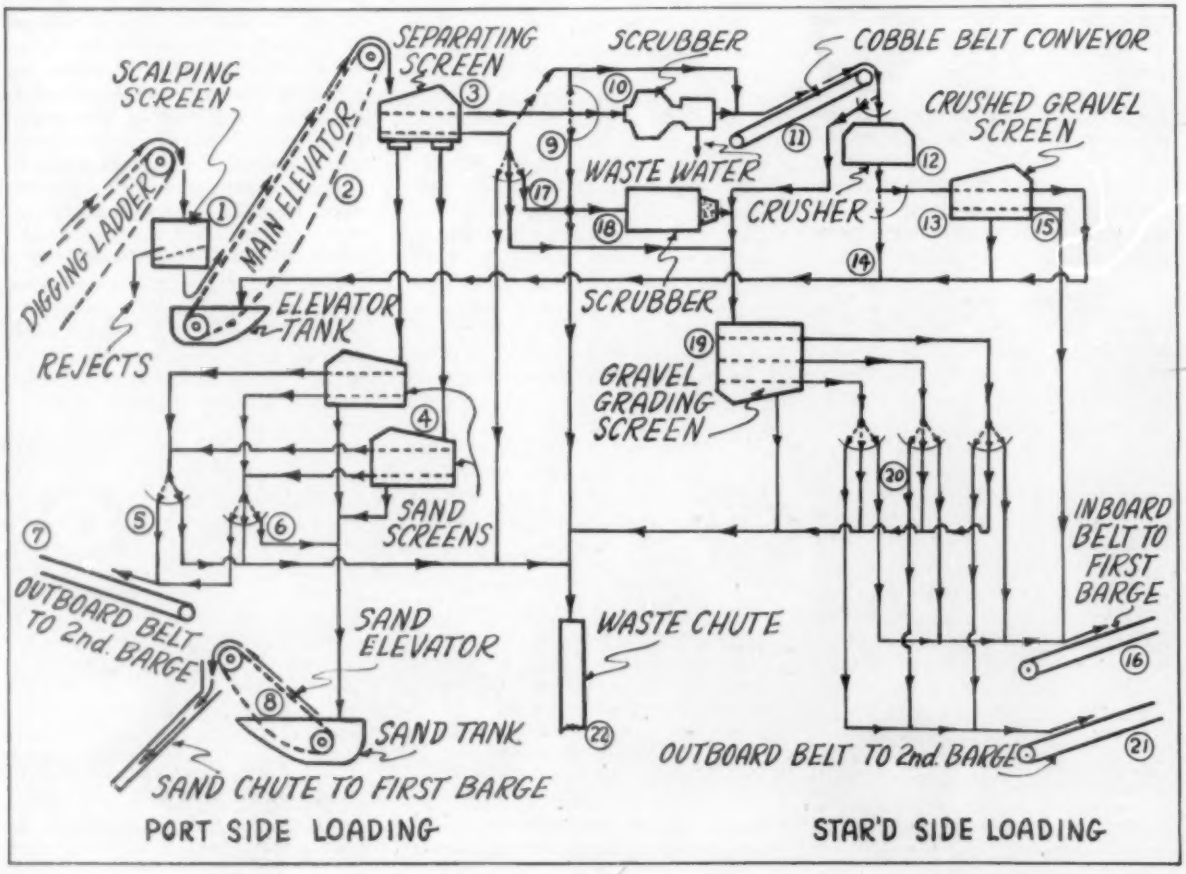
A crushed gravel can be produced, or, on ordinary production, the crushed particles may pass into the elevator sump to be mixed with the uncrushed gravel. It is estimated that ordinary uncrushed gravel contains about 40 percent crushed particles. About 80 to 90 tons of gravel per hour is put through the crusher including some re-circulating load. Experience has been that cobbles as high as 5-in. can be reduced to chips through the crusher, but as a rule the feed is smaller to hold down the motor load or the circulating load would build up. Hammer life is about three weeks the gravel being about 85 percent $SiO_2$.

### Diesel Engine Drives D-C. Generators

In producing a crushed gravel, the crusher discharge is put over a separate double-deck crushed gravel screen, oversize and undersize returning into the elevator tank, and the fraction between the two decks going to a barge loading belt conveyor. Crusher dust blends with the natural sand and increases the percentage of minus 100-mesh fines from about 1½ percent to 4 or 5 percent. It is the usual practice to produce four grades of material simultaneously for direct loading into barges of 500 ton capacity.

All the equipment drives, except for those steam-driven, are by individual Westinghouse splash-proof d.c. motors. Direct current was considered preferable in order accurately to vary the crusher speed and to maintain a constant voltage. Power is developed by two 140 kw. to 200 kw. d.c. Elliott variable speed, 250-volt generators, each direct-connected to a 300-hp., 8 cyl. Cooper-Bessemer Diesel engine. The power plant equipment is designed so that a constant voltage can be held at any engine speed between 500 and 750 r.p.m., to accommodate possible future increases in the plant load. Ordinarily one power unit operating at 500 r.p.m. is sufficient to drive the plant, supplemented by the 125-hp. steam engine, the other unit being needed only when the second scrubber is running and/or the crusher is turning at high speeds.

All the design and construction work on the dredge was performed by the Engineering Works Division of Dravo Corp., at Neville Island.




**Flow sheet of rebuilt dredge plant. 1—scalping screen, 2—main elevator, 3—main separating screen, 4—sand screens, 5 and 6—regulating gates, 8—dewatering elevator, 9—gate for passing large size material around scrubber, 10—scrubber for large gravel, 11—belt conveyor, 12—crusher feed box, 13—crusher, 14—gate, 15—crushed gravel screen, 16—inboard loading belt, 17—gate for passing smaller size gravel around (18) scrubber for smaller size gravel, 19—gravel grading screen, 20—gates for distributing material, 21—outboard belt, 22—waste chute**

# Problem of Elongated Pieces

**ARTICLE THIRTEEN**

**On sizing, testing and specifying aggregates— New England experience shows specifications on flat particles contain excessive requirements**

By ELWOOD T. NETTLETON

IN CRUSHED STONE specifications and literature the usual definition for elongated and flat particles are those individual pieces whose length exceeds five times their least dimension. The reasons engineers do not wish such particles are as follows: the possible difficulty in finishing concrete; fear that individual particles might lie horizontal in the surface of the concrete; fear that there might be a higher void content in the concrete; assumption that flat particles break easier under the roller in bituminous macadam; and fear that flat pieces do not have as much cohesive resistance as cubical pieces.

The customary requirements in the specifications are five percent allowance for elongated and flat particles.[1] Usually this percentage is indefinite since it does not specify whether the allowance is by weight, or by the number of pieces. This allowance appears to have been arrived at arbitrarily by engineers, probably erring on the side of safety, since there seems to be no definite experimental basis for such a figure.

Since no mechanical tests have been approved for determining elongation, it was necessary for the writer to adopt the laborious hand measuring method. Consequently, the number of tests to run had to be limited in number. It was decided to run six tests on large size stone aggregate, over 1-in. size, as is used in concrete, penetration macadam and waterbound macadam roads. Although crushed stone under 1-in. in size, manufactured as the result of primary crushing, contains a much larger percentage of flats and elongated material, at least in trap rock, there seem to be less objections to it on the job than in the smaller sizes. Samples of stone were taken from those plants in which the product appeared to contain the greatest number of flat and elongated pieces.

The present current theory is that the greater the reduction ratio of the crusher, the greater the percent of flat and elongated fragments.

It is interesting to note that this visual selection of samples substantially checked the theory, as compared with the actual reduction factors of crushers operated by the New Haven Trap Rock Co.[2]

As the result of these tests, all six samples would have been rejected if the 5% tolerance was insisted upon, and four samples should have been rejected if the 10 percent tolerance was used.

In the case of all of the tests, the stone was actually accepted and used in the construction, without any difficulty or objections, and an excellent finished job resulted. The first three samples of stone were used in three penetration macadam jobs; the next two samples of stone were used in waterbound macadam jobs; and

MEASUREMENT OF ELONGATED PARTICLES
(Expressed in number of pieces)
2-IN. STONE

| Amount of Elongation | Quarry No. 1 Test 6A | | | Quarry No. 1 Test 5A | | | Quarry No. 6 Test 47A | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of pieces retained on square-mesh testing screens | | | No. of pieces retained on square-mesh testing screens | | | No. of pieces retained on square-mesh testing screens | | |
| | 2½ | 2 | 1½ | 2½ | 2 | 1½ | 2½ | 2 | 1½ |
| 7+ | — | 2 | — | 0 | 0 | 0 | 0 | 6 | 4 |
| 6—7 | — | 7 | — | 1 | 2 | 3 | 0 | 4 | 2 |
| 5—6 | — | 15 | — | 0 | 2 | 1 | 0 | 9 | 7 |
| 4—5 | — | 33 | — | 2 | 11 | 8 | 1 | 17 | 23 |
| 3—4 | — | 55 | — | 11 | 31 | 9 | 11 | 24 | 31 |
| 2—3 | — | 67 | — | 4 | 36 | 18 | 4 | 54 | 47 |
| 1—2 | — | 18 | — | 2 | 10 | 4 | 1 | 15 | 13 |
| | 24/197 = 12.2% | | | 9/155 = 5.8% | | | 32/273 = 11.7% | | |

Gradation as expressed in square-mesh testing screens

| % Passing | 2½ | 2 | 1½ | 1 | ¾ | ½ | ¼ | |
|---|---|---|---|---|---|---|---|---|
| 6-A | 100 | 83.7 | 20.5 | 1.8 | 0.8 | 0.8 | 0.6 | Penetration Macadam |
| 5-A | 96.8 | 77.7 | 16.8 | 1.8 | 1.1 | 0.9 | — | |
| 47-A | 100 | 87.1 | 31.6 | 2.6 | 1.4 | 1.1 | — | |

2-IN. MIXED STONE

| Amount of Elongation | Quarry No. 1 Test 11A | | | Quarry No. 1 Test 8A | | | Quarry No. 6 Test 48A | | |
|---|---|---|---|---|---|---|---|---|---|
| | No. of pieces retained on square-mesh testing screens | | | No. of pieces retained on square-mesh testing screens | | | No. of pieces retained on square-mesh testing screens | | |
| | 2½ | 2 | 1½ | 2½ | 2 | 1½ | 2½ | 2 | 1½ |
| 7+ | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 3 |
| 6—7 | 0 | 5 | 3 | 1 | 3 | 0 | 0 | 3 | 5 |
| 5—6 | 1 | 4 | 6 | 1 | 8 | 1 | 0 | 7 | 8 |
| 4—5 | 6 | 13 | 6 | 10 | 11 | 13 | 1 | 6 | 19 |
| 3—4 | 14 | 22 | 13 | 10 | 26 | 13 | 3 | 15 | 30 |
| 2—3 | 4 | 27 | 13 | 7 | 36 | 16 | 4 | 31 | 35 |
| 1—2 | 1 | 6 | 6 | 0 | 5 | 4 | 0 | 6 | 16 |
| | 22/153 = 14.3% | | | 16/167 = 9.6% | | | 26/192 = 13.5% | | |

Gradation as expressed in square-mesh testing screens

| % Passing | 2½ | 2 | 1½ | 1 | ¾ | ½ | ¼ | |
|---|---|---|---|---|---|---|---|---|
| 11-A | 100 | 68.7 | 19.4 | 5.1 | 4.5 | 4.4 | 4.2 | Waterbound Macadam |
| 8-A | 100 | 68.4 | 15.9 | 2.6 | 2.0 | 1.8 | 1.6 | Waterbound Macadam |
| 48-A | 100 | 91.8 | 66.2 | 16.2 | 4.5 | 1.4 | 0.9 | Concrete (2 jobs) |

[1] Connecticut allows 10%.

[2] The Shape of Road Aggregates and its Measurement—A.H.D. Markwich—pub. by British Minister of Transport and Cubical Crushed Stone — Pierre Hanker — Rock Products, Oct. 1937, p. 62.

[3] See tabulation on Crusher Reduction Factors.

CRUSHER REDUCTION FACTORS

| PLANT | CRUSHER TYPE | | | REDUCTION FACTOR |
|---|---|---|---|---|
| Quarry No. 1 | Jaw | 48x60 | Set 6-in. 1½-in. + | 48 / 6 = 8 |
| Quarry No. 3 | Jaw | 30x42 | 3½-in. | 30 / 3.5 = 8.5 |
| | Gyratory | 7½ | 2½-in. | 3.5 / 2.5 = 1.4 |
| Quarry No. 4 | Jaw | 42x54 | 6½-7-in. | 42 / 6.5 = 6.5 |
| | Cone | 5½ | 1¼-1⅜-in. | 6.5 / 1.25 = 5.2 |
| Quarry No. 6 | Jaw | 30x42 | 3½-in. | 30 / 3.5 = 8.5 |
| | Gyratory | 6 | 2¼-in. | 3.5 / 2.25 = 1.5 |
| Quarry No. 7 | Jaw | 48x72 | 6½-in. | 48 / 6.5 = 7.4 |
| | Gyratory | No. 10 | 3 ? | 6.5 / 3 = 2.2 |
| | Cone | 7 | 1½-in. ? | 3 / 1.5 = 2.0 |

the last sample of stone was used in two concrete pavement jobs which were operating simultaneously. One of these jobs was using a 1:2:3.61 concrete finished in the ordinary manner, and the other, a 1:2:4.1 concrete employing a vibrator.

Accepting the definition of elongated particles as one whose length is five times its least dimension, the following assumptions might be used:

Elongation in ordinary crushed trap rock of sizes below 1-in. is not detrimental, and sizes greater than 1-in. is not detrimental up to 15%, as expressed by the number of pieces.

*(To be continued)*

## Crusher Mounted on Rails

*(Continued from page 38)*

vary the speed of the connected mechanism.

When the operator, in this case at the screening plant far from the surge tank, changes his indicator to vary the speed the diameters of both pulleys change automatically while retaining the belt tension. As dial readings on the indicator are proportionate between maximum and minimum speeds, an infinite number of speed variations are possible. Plant loads can easily be varied and maintained to permit peak operating capacity regardless of the specification being filled. Feed arrangements and pit equipment, including the crusher car, were designed and built by The Conveyor Co., Los Angeles, which also furnished the conveyors.

As built in 1933, capacity was limited in the number of gradings of material produced and totalled 60 to 65 tons per hour. All the crushing then was done by the 12- x 24-in. jaw crusher mentioned earlier and a single set of rolls for secondary reduction. In 1935, Allis-Chalmers Newhouse crushers, a No. 5 and a No. 7, were put in for reduction purposes, three 4- x 8-ft. Conveyor Co. screens, one 3-deck and two 2-deck, were installed on the gravel side of the plant and a new 4- x 12-ft. Allis-Chalmers three-deck, low-head vibrating screen was installed on the crushed rock side of the plant. Incoming feed material from the surge tank enters a 40-in. by 20-ft. trommel screen where minus ¼-in. material is scalped off for the production of plaster sand and concrete sand, and a separation of coarser sizes is made for feed from surge bins to the Newhouse crushers. Gravel is elevated to the gravel sizing screens and selective sizes over 1-in. and oversize from the trommel goes directly to the rock crushing plant located under the trommel. The common practice in the Los Angeles area is to wash gravel and produce crushed rock unwashed.

With increased production, storage capacity was enlarged, a storage conveyor installed, and a reclaiming hopper was added for trucking material to a ramp where it is returned to the incoming pit conveyor. Products manufactured include washed concrete sand, unwashed concrete sand, unwashed as well as washed plaster sand, and an asphalt sand. Normally, washed 1½-in., 1-in., ½-in. and 5/16-in. gravel are produced along with unwashed crushed 1½-in., 1 1/16-in., ¾-in., No. 4 (passing ⅜-in.) material and a minus 10-mesh dust. Crushers are easily bypassed in producing coarser grades.

### Producing Washed and Unwashed Sands

As part of the regular operation, a single sand drag produces either washed plaster sand or washed concrete sand from the minus ¼-in. material coming from the trommel scalping screen. In making the unwashed products, the same material is carried by belt conveyor to a separate unit consisting of a 4- x 12-ft. revolving screen and steel bin. Using 3/32 x 1-in. slotted openings, throughs are unwashed plaster sand, and the rejects are sold as pea gravel.

Part of the incoming material is diverted at the screen to the storage belt. Plaster sand coming through the screen openings enters a screen-length hopper sloping to a 12-in. gathering screw conveyor which has left and right hand flights, installed for mixing puroposes to prevent segregation. The screw conveyor discharges into a truck-loading bin. The screen has a row of brushes riding its circumference to prevent blinding. Production of this material is 40 to 60 tons per hour.

The sand operation was scheduled for a complete change since this article was written. Washed concrete sand will be placed over the truck loading tunnel to get away from rehandling. Two new bunkers, each of 1250 tons capacity, were to be added, one for unwashed concrete sand and one for unwashed plaster sand.

Unwashed crushed rock, until 1939, had been produced by a 4- x 12-ft. Allis-Chalmers three-deck screen and 16- x 36-in. rolls.

With increased demands for finer grades of crushed material, a No. 322 type "R" gyratory reduction crusher, recently placed on the market by Allis-Chalmers Manufacturing Co., was installed. It is a comparatively small unit, mounted under a surge bin, which is fed either gravel or crushed rock by belt conveyor or gravity chute and discharges to a belt conveyor serving the crushed rock plant, where it is dry screened. With a 2½-in. feed about 40 tons per hour of crushed rock is produced, 100 percent passing ¾-in. square openings, using a 25-hp. electric motor. P. Flynn is superintendent of the plant.

# Measuring Dust Collector Performance

**Method of sampling to determine efficiency of new stack dust collectors is described. Dust is recovered and returned into wet process kilns**

By GEORGE L. KIRP* and R. B. FOLEY**

ALTHOUGH A GREAT DEAL of attention has recently been focused upon kiln gas dust escape in the cement industry, the problem is really as old as the industry itself. To those familiar with the process of burning portland cement clinker, the utter impossibility of complete elimination of finely divided dust from the gases at their origin, the kiln proper, is thoroughly appreciated. There is probably no other industrial operation in which conditions are more ideal for the creation of a dust-gas suspension; this creation is an inherent characteristic of the burning process. For one reason or another, however, the problem has recently become more acute. In some instances, plants which had experienced no increase over their average daily dust loss have found their recent loss to be objectionable to the public. In other instances, plants have experienced a definite increase in their average daily dust loss. In either case, the most obvious and satisfactory solution has been collection of the greater percentage of dust in the gases.

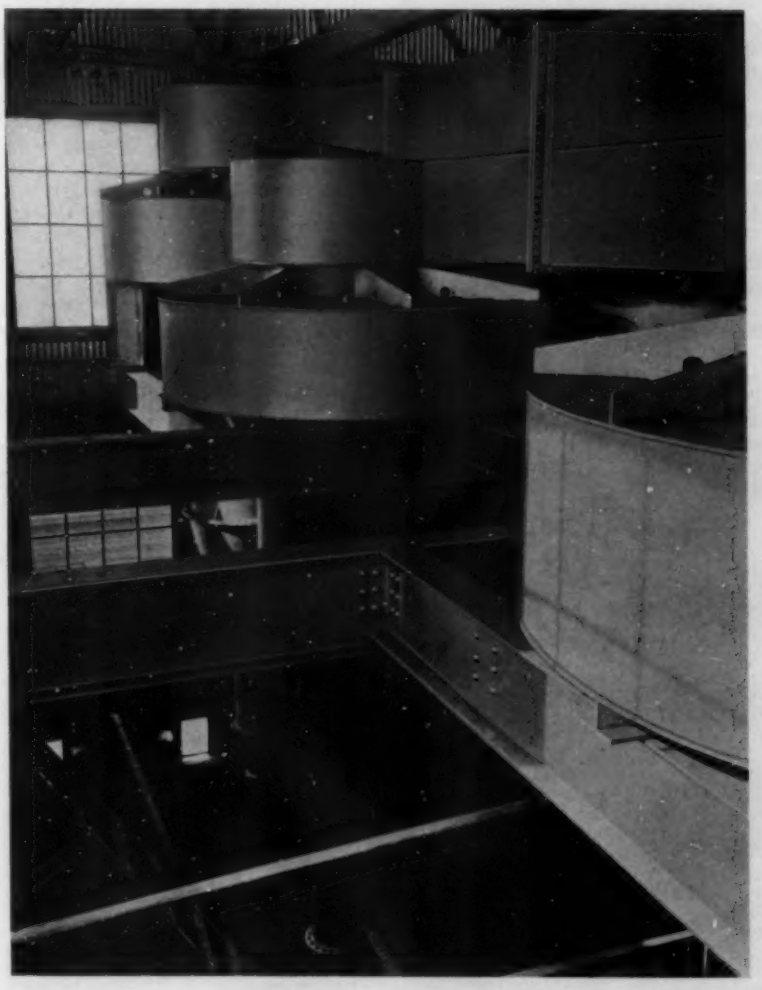
The problem of collecting cement kiln gas dust has been adequately solved by manufacturers of various types of dust collection equipment. The choice of equipment for any particular collection problem usually depends upon a consideration of the important details involved in that problem. Some plants, for certain reasons, require very high collection efficiency; other plants neither require nor want extremely high collection efficiency. There is available today a type and design of dust collection equipment to suit the requirements of every plant having a kiln dust problem.

In 1939 after having studied its kiln gas dust problem for several months in collaboration with eminent dust collection engineers, the Petoskey Portland Cement Co. selected American Blower Corp. type "D" dust collectors as being best suited to meet all the requirements in its particular problem. At the same time, a mechanical conveying system for handling dust precipitated in the flues, boiler, and economizer passages was proposed. The design and erection of these two installations, as well as the installation of latest type Minogue feeders for returning collected dust to the kilns, was under the direct supervision of Fred L. Boland, plant general superintendent.

### Separate Dust Collector System For Each Boiler Unit

The general arrangement of kiln-boiler-collector equipment in the Pe-

View of new dust collector system, with collection valves to screw conveyor shown below



*Chemical engineer, Petoskey Portland Cement Co., Petoskey, Mich.
**Engineer, Dust Collection Division, American Blower Corp.

toskey plant is as follows: the gases from the four 10 x 150-ft. rotary kilns discharge into a common header from which they pass through four waste-heat boilers and economizers. A separate dust collector system and Sirocco induced draft fan handles the gases from each boiler unit. In connection with each of the boilers, the collector system consists of a group assembly of four type "D" dust collectors and the gases are handled by a Sirocco fan located on the exhaust side of the collectors. The two fans on boilers 1 and 2 both discharge into a common brick-lined concrete flue leading to stack No. 1.

Dust caught by the eight collectors in these two systems is discharged into a common conveyor running to a Link-Belt vertical lift and thence to the disposal system proper. Similarly, the fans on boilers 3 and 4 discharge into another brick-lined concrete flue leading to stack No. 2 and the dust from the eight collectors discharges into a common screw running to another Link-Belt vertical lift and thence to the disposal system proper.

A Link-Belt drag chain conveyor system was installed under the kiln housings, flue, boiler and economizer passages to reclaim the dust which precipitates in each location. In this system, all the reclaimed dust is brought to a common screw running to a bucket elevator which discharges at a point centrally located in the disposal system proper.

A positive action, short pitch 6-in. screw conveyor driven through a Reeves variable speed transmission feeds the dust to each Minogue feeder installed on each kiln at a distance of 28 ft. from the kiln feed end. A special by-pass spout is provided on each screw feeder spout for the purpose of providing a means for determining and checking feeder delivery rate. Two dust storage bins provide blending and storage facilities. Each of these bins is provided with a spout for the purpose of emptying the system of dust should the necessity for such action arise. Reference to the accompanying flow diagram will clarify the following explanation of the disposal system.

Dust from the Link-Belt drag system is elevated in the bucket elevator to a point above and midway between kilns 2 and 3. The discharged stream is split by the butterfly valve, one part going into No. 1 bin screw conveyor and the other part going into No. 2 bin screw conveyor. Collector dust from boilers 1 and 2 is elevated to No. 1 bin screw by vertical lift No. 1, and that from boilers 3 and 4 is elevated to No. 2 bin screw by vertical lift No. 2. The material in each screw passes over the connected dust feeders and the constant excess of dust in each bin screw goes to its respective bin. Material is fed constantly from each bin and is conveyed back to the bucket elevator as shown in the diagram, thus forming a closed circuit in which a rather thorough mixing and blending is accomplished. The actual operation and control of this system is not nearly as complicated as it appears. The delivery per minute of each feeder is weighed once each shift as a check on its performance and it has been found, over a period of eight months operation, that they are accurate to within plus or minus 2 lb. per minute.

Typical chemical analyses of dust caught by and escaping the collectors are as follows:

| | Collected | Escaping |
|---|---|---|
| $SiO_2$ | 19.02 | 12.90 |
| $Al_2O_3$ | 8.09 | 5.81 |
| $Fe_2O_3$ | 4.95 | 2.26 |
| CaO | 43.57 | 24.01 |
| $SO_3$ | 11.57 | 25.75 |
| MgO | 1.90 | 1.71 |
| Loss | 4.07 | 4.98 |
| Alkalies by Diff. | 6.83 | 22.58 |

It was found during 1939 operation, that stone from certain parts of the quarry caused a heavier concentration of dust in the gases than stone from other parts. Without experimental evidence for substantiation, it is believed that the calcination characteristics of the stone in different parts of the deposit varies, probably resulting at times in calcination with release of carbon dioxide gas with almost explosive violence and consequent high dust concentration. Mixes with this stone are almost invariably harder burning. It was also found that coal carrying more than 2 percent sulphur proved uneconomical for fuel. There was a definite tendency for the sulphur to concentrate and create a production and fuel economy problem. These are considered purely local problems, however, and would not necessarily need to be anticipated in other similar installations.

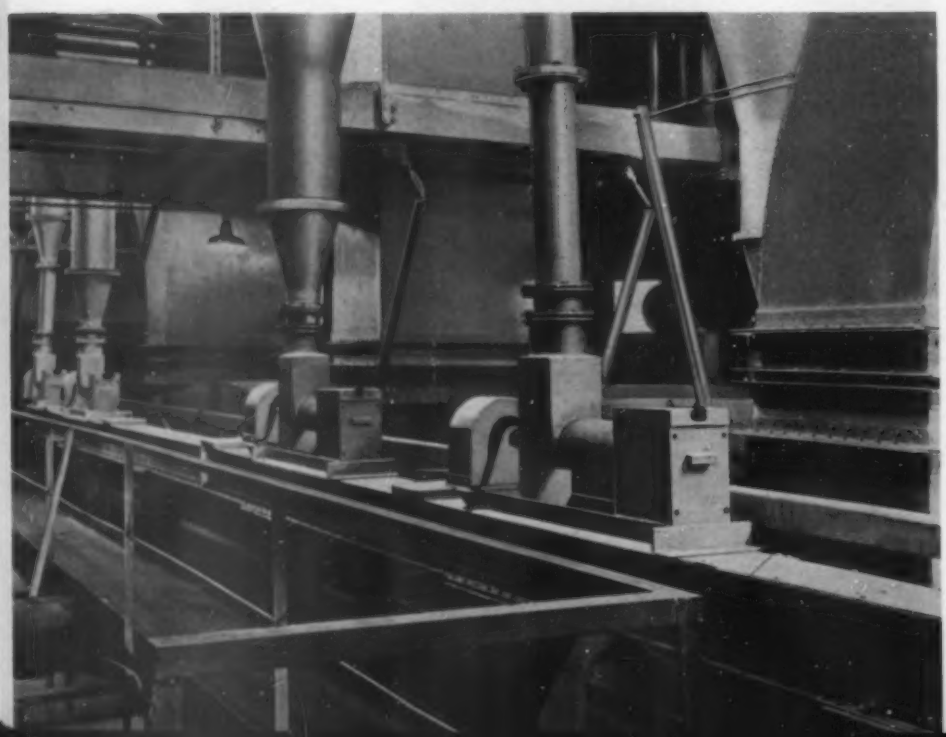
### Check Collector Efficiency

The general method followed in determining the performance of the dust collector equipment was that of weighing the dust caught by the collector system and determining the weight of dust passing the collectors by measuring the gas volumes and sampling the gases beyond the collector outlets.

The design and arrangement of the equipment is such that it was most practical to test the dust collector system in two groups of eight collectors each. The two concrete flues from the fan outlets to the stacks are the longest straight runs of breeching in the system and thus provided the best possibility of uniform gas flow for sampling. This, in addition to the layout of the two conveyor systems, made it practical to test the eight dust collectors serving boilers No. 1 and 2 as one system, and the eight collectors on boilers No. 3 and 4 as another system.

Sampler openings were provided in

**Collector valves and attachment to dust screw conveyor used for Nos. 1 and 2 waste heat boilers**



the straight run of each flue at a point approximately 40 ft. beyond the fan outlets and samples were taken at a number of different points through each opening. Gas samples were drawn out through a specially designed, 3-in. sampling tube provided with five interchangeable nozzles. Before each test, a pitot tube traverse was made in the flue to determine the velocity at each sampling point. The proper size of nozzle was selected for each sampling point and the gas volume determined to give as nearly as possible the same velocity at the nozzle entrance as existed at that point in the flue. The gas samples were drawn through two small high efficiency, type "D" collectors in series to remove the dust. Previous tests on this sampling unit showed a dust collection efficiency of practically 100 percent with dust similar to that handled in these tests, and examination during this field test showed no visible dust in the discharge from the second collector.

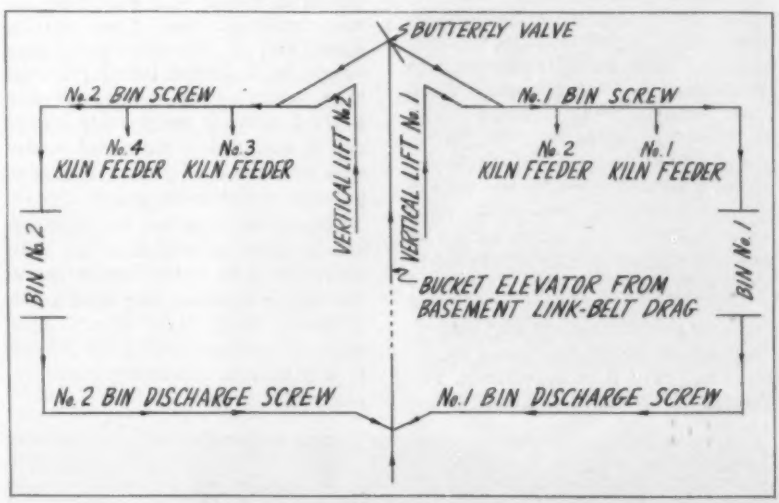
The volume of the gas sample was measured by means of the pressure drop across the calibrated sampling collector unit and a slide valve between the collectors and the fan used to draw out the sample was adjusted to maintain the desired predetermined volume. A test of approximately one hour's duration was run at each sampling point. The dust caught in the sampling collectors was then dried and weighed on a laboratory balance. The weight of this dust was divided by the total volume of gases handled by the sampling unit during test period to determine the concentration of dust at the sampling point.

During each test the dust caught by the eight collectors under test was by-passed into a vertical pipe to the basement where it was drawn out and weighed on platform scales for a five-minute period out of every fifteen-minute period. Owing to field conditions and the large quantity of dust which the collectors were removing from the gases, it was found impractical to weigh all of the dust caught during the hour's run, so this method was used to determine the rate in pounds per minute at which the dust was caught during each test. As the drag conveyor in the basement which handles the dust from beneath the boiler feeds into an elevator to the dust storage bins, it provided a convenient means for disposal of the dust after it had been weighed.

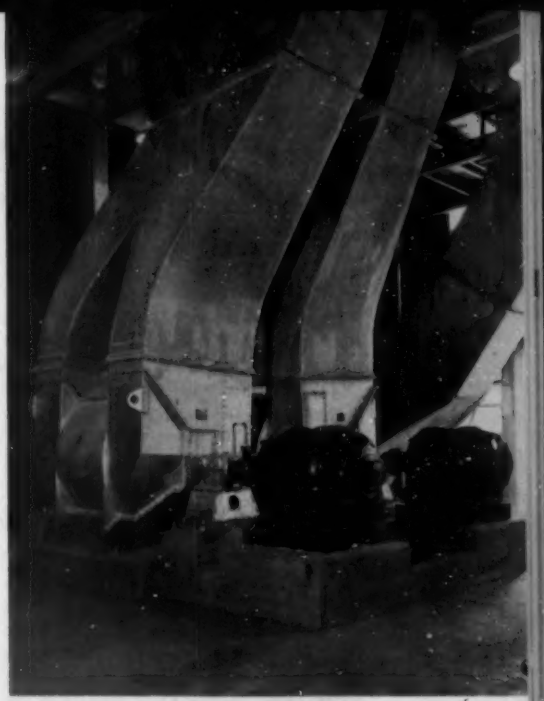
Practically all of the dust caught in the sampling unit was of sub-mesh size (85 percent of the particles were 10-micron or finer), while a typical size analysis of the dust caught by the collector system during the tests, showed the following percentages finer than a given screen or than of a given micron size:

| Particle Size | Percent |
|---|---|
| 200 Mesh Screen | 96.4 |
| 325 Mesh Screen | 91.2 |
| 400 Mesh Screen | 89.2 |
| 20 Microns | 77.0 |
| 10 Microns | 57.0 |

The design and construction of the type "D" dust collectors makes it possible to use them as a calibrated gas flow meter. The volume of gases passing through the collectors was thus determined by measuring the pressure drop across each collector.




**Flow diagram of conveying system for dust disposal**



**Induced draft fans and ducts connected to boilers 3 and 4**

These readings were taken at frequent intervals during each test. This provided a continuous check on the volume of gases as determined by the pitot tube traverse. Gas temperatures were measured in the flue at the sampling station, at the economizer outlets, induced draft fan inlets, and in the sampling collector unit, by means of thermocouples and a pyrometer.

Every effort was made throughout the tests to hold all conditions as nearly uniform as possible. A constant amount of dust was fed back through the Minogue feeders to each kiln and the induced draft fan speed controls on the systems under test were set at the same points for all the tests on these systems. After correcting for differences in temperatures, the average gas volume for any test, as measured by the collector pressure drops, did not vary more than plus or minus three percent from the average gas volume for all the tests on each system.

Weighted averages were used in calculating the results of the tests in order to compensate for the slight differences in conditions in the tests at different sampling points on each group of collectors. For example, all gas volumes were corrected to the average gas temperature at the collectors.

The gas volume in each section of the flue at the time of the sampling test made in that section, was determined by multiplying the average volume as measured by the collector drops throughout the test, by the

(Continued on page 46)

# Safe Handling of Explosives

By C. H. FISCHER*

MANY USERS of explosives do not obtain full dollar value from their explosives because of improper storage. Explosives left or stored where they can absorb moisture will have a lowered efficiency, which means loss of money value to the purchaser, and may cause misfires. They should not be left or stored where children or unauthorized persons have access to them, or in dwellings, offices, barns, boiler rooms, blacksmith and carpenter shops, oil and tool houses.

When selecting the location of a storage magazine, it should conform to the requirements of the American Table of Distances which are based on the assumption that there will be a natural or artificial barricade between the magazines and the nearest inhabited buildings, public railways and public highways. If such protection does not exist, the distances given in the Table should be doubled.

The barricade should be of such height that a straight line drawn from the top of any side wall of the magazine to any point of the inhabited building to be protected or to any point 12-ft. above the center of the railroad or highway to be protected, will pass through such intervening natural or artificial barricade. An efficient artificial barricade is an artificial mound of earth of a minimum thickness of three feet. In building barricades, it is important not to use stone or gravel or other material that might become missiles should there be an explosion in the magazine and to erect them so there will be sufficient space between the magazine and barricade to provide proper ventilation and room for cleaning out dead leaves, grass and other debris. The distance between the magazine and barricade should preferably be about three feet.

### Location of Magazine

If more than one magazine is built in the same location, each magazine (except blasting or electric blasting caps) containing more than 5000 lb. of explosives and not over 25,000 lb. should be at least 200 ft. from any other magazine, and if over 25,000 lb. of explosives are to be stored in a magazine, the distance between such magazines (200 ft.) should be increased by 2-2/3 ft. for each additional 1000 lb. over 25,000 lb. The distance between magazines may be reduced one-half if the magazines are effectually protected one from the other by natural or artificial barricades. Blasting supplies magazines should not be located nearer than 100 ft. to any other magazine.

### Types of Construction for Safe Magazines

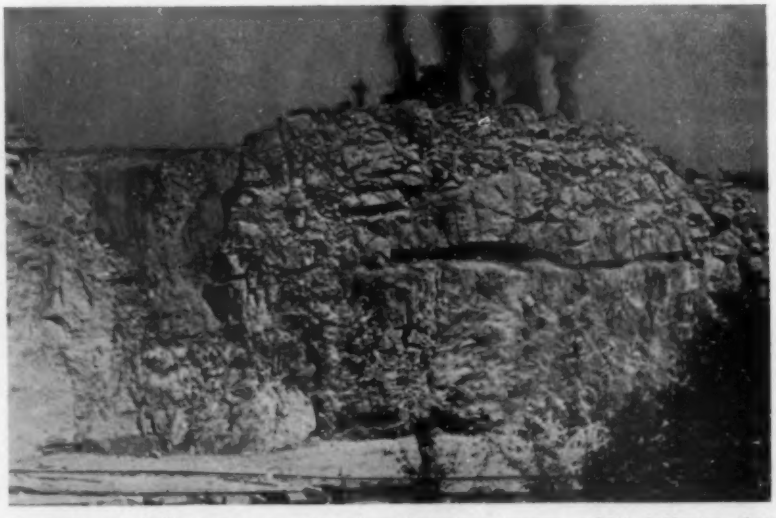
In selecting the magazine building, three types of construction may be selected; brick, sand filled, and fabricated metal or portable magazines. If the storage is of a permanent nature, the brick magazine will usually be found the most economical over a long period of years due to the low maintenance costs. However, initial cost frequently enters the picture and in certain localities the construction costs make it expedient to erect a sand filled magazine. Sand filled walls to be bullet-proof should be from 8 in. to 12 in. thick. Fabricated metal magazines should be bullet proofed if used for the storage of high explosives, with either brick or sand filled walls. Bricks should be medium soft, and not paving blocks or hard burned bricks. The sand should be sharp and coarse; crushed stone or gravel must not be used.

Adequate ventilation in an explosives magazine is of importance. The foundation should have screened ventilators approximately 6- x 6-in. spaced not over 5 ft. center to center, and the floor should stop 2-in. from the walls all around the building; the roof should be equipped with approximately one 12-in. ventilator for each 12 ft. length of magazine. If the magazine is ceiled, which in many instances is desirable in order to reduce the temperature in the building, the ceiling should stop 2 in. from the walls.

No markings of any kind should be painted on storage magazines, unless required by state laws, but the property should be posted with signs located on trees or posts in such locations that any shots fired at them will not travel in the direction of the magazines.

The handling of explosives should be given to competent persons who understand the safe methods of transporting and using them. It is also important in handling explosives that they be stored and used so that the older explosives will be taken out first. Vehicles used in transporting explosives should be in good mechanical condition free from surplus grease and oil; the electrical system should be inspected before starting; they should not be overloaded; and a truck with a metal body should not be used unless the metal is covered with wood or other material to prevent contact with metal.

Blasting and electric blasting caps should never be stored in the same magazine with other explosives or left where children will have access to them. Never store primed cartridges in a magazine or make primers in a magazine containing other explosives.



Typical well drill shot in a midwestern limestone quarry, which indicates that powder was placed to give good fragmentation in bringing down 9000 tons of stone

*Mgr., Storage and Delivery Section, E. I. du Pont de Nemours & Co., Wilmington, Del. Abstracted from a paper presented before the Cement and Quarry section, National Safety Congress.

# Concrete Men Talk Ready Mix

**American Concrete Institute continues to devote more attention to ready-mixed concrete. New theories on mix design also of interest to the industry**

By NATHAN C. ROCKWOOD

THE PROGRAM of the 36th annual convention of the American Concrete Institute, Chicago, Ill., February 27-29 was particularly interesting to manufacturers of ready-mixed concrete, of whom a growing number are becoming members of the Institute. Incidentally, the new president is R. B. YOUNG, Toronto, Ont., who has been active as an officer, director and technical committee member of the National Ready Mixed Concrete Association.

### Mix Design

Three papers were specifically devoted to design of concrete mixes. The first of these by CHARLES T. KENNEDY, consulting structural engineer, Cincinnati, Ohio, was published in the February *Journal* of the Institute. It describes a rational method for design of mix with respect to workability. A "workability factor" is developed which has a similar relation to the workability of the concrete as the water-cement ratio has to the strength. The author found that for any given cement and water-cement ratio, this factor depends upon the relative quantities of cement, water and aggregates and upon certain easily determined physical characteristics of the aggregates.

The author states:

The fundamental law of the workability of the mix is this: for a mix to be workable, the volume of cement paste,—i. e., the absolute volume of the cement plus the volume of the mixing water,—must be at least equal to the volume of the voids in the dry rodded mixed aggregate.

Concrete in which the volume of cement paste was no more than equal to the volume of voids would be workable only under a strictly laboratory definition; it would have a slump theoretically equal to zero. For practical purposes, an excess of cement paste is required.

The second law of the workability of the mix is this: for any required degree of workability, the necessary excess of cement paste depends (a) upon the consistency of the cement paste itself,—lower water-cement ratios requiring larger excess amounts than higher ratios,—and (b) upon the surface area of the aggregate,—the larger the surface area, the greater the excess required.

The following remarks are particularly pertinent:

The workability factor conception makes it possible to define for the first time what is meant by that much-abused term,—"a well-graded aggregate." A well-graded aggregate is one that combines the primary requirement of a low percentage of voids with the secondary requirement of a low surface area; these characteristics, together with a certain degree of continuity of grading (to eliminate freak "gap" gradings) insure an economical mix. This method also demonstrates the advantage of using as large a maximum size of aggregate as is practicable; lower percentages of voids are obtainable with larger aggregate, and the surface area is reduced.

**Durability of Concrete.** The use of a low cement content is not merely a matter of low first cost. Emphasis in recent years upon a high quality of cement paste has obscured the importance of a low quantity of paste. Of two mixes, of the same w/c ratio and degree of workability, the one containing the less cement paste per cubic yard will produce the better concrete.

R. B. Young, new president of the A.C.I.

* * * * *

**Control**—A striking characteristic of the workability curves is that, in the usable range, they are almost vertical. For slumps of from 2 in. to 6 in., small changes in the workability factor produce large changes in the slump. This explains the phenomenon familiar to every field worker in concrete,—the sudden variation in slump occurring without obvious change in the mix. The workability factor translates this rapid change of slope into an accurate method of control; provided that the grading of the aggregates remains constant, slight variations in the water-cement ratio are readily detected by the corresponding change in the slump.

The design of the mix according to the workability factor method requires only simple well-known laboratory determinations. The physical constants of the materials,—the specific weights (or specific gravities)—are easily determined, and vary very little for any given source of supply; if the nature of the aggregate is known, the specific weight may be obtained from any standard work of reference. In the case of the typical concrete aggregates,—silica and limestone,—the specific weights are practically identical, both being usually given as 165 lb. cu. ft. The determinations for unit weight and sieve analysis are both simple and reliable; the results are surprisingly uniform for aggregates of a common source. With reference to these two characteristics of the aggregate, it should be noted that, while the relationship between them is obscure, they are certainly not independent. For a given aggregate, as long as the sieve analysis remains the same, the unit weight will be constant. The converse, however, does not hold; a number of different gradings will produce the same unit weight. Finally, the slump test, if not demonstrably the most accurate measure of workability, is certainly the best known, and is best adapted to job conditions. Standard specifications for all of these tests have been available for years, and therefore no new technique is required in the application of the workability factor method of design.

HENRY L. KENNEDY, Dewey and Almy Chemical Co., Cambridge, Mass., discussed a "Revised Application of the Fineness Modulus in Concrete Proportioning," elaborating on the data given in ROCK PRODUCTS, May, 1939, p. 38. These data show that when fineness moduli are plotted against strengths of resulting concrete, there is only a narrow range which gives optimum results. The same fineness modulus requires the same cement content, regardless of the grading, Mr. Kennedy said. However, the fineness of the cement is a factor that must be taken into consideration.

PROF. W. M. DUNAGAN, Iowa State College, Ames, Ia., in a paper "An Application of Some of the Newer Concepts to the Design of Concrete Mixes" reviewed all the important theories on the subject with the object of combining and simplifying their practice. He seemed to lean most favorably toward C. A. G. Weymouth's theory of particle interference, which was explained in detail in ROCK PRODUCTS, February 25, 1933. Prof. Dunagan said the Fuller ideal straight-line grading for aggregates could not be properly used without readjustment in line with Weymouth's theory.

### Arguments for Sale of Ready Mixed Concrete

Most of one afternoon's session was devoted to the ready-mixed concrete industry. ALEXANDER FOSTER, JR., vice-

president, Warner Co., Philadelphia, Penn., led off with a paper describing the ready-mixed concrete business of Philadelphia, written by himself, HERBERT J. KNOPEL, consulting engineer, and HERBERT J. WHITTEN, general superintendent, Warner Co. The authors traced the history of the industry, economic considerations and a study of the market.

Economic considerations were listed as follows:

(1) The degree of control over the quality of the concrete. The established ready-mixed concrete operator, of any standing, is equipped with accurate weigh batchers, water measuring devices, facilities for heating materials in cold weather, etc., which are likely to be absent in the case of job-mixed concrete except on the larger jobs. The ready-mixed concrete operator can, therefore, furnish the small and moderate sized job with facilities for control which are economically available only on big projects.

(2) The opportunity for technical control. The ready-mixed concrete operation can provide for a quality of inspection not ordinarily feasible on the job, except in the case of the larger projects—and this is particularly true of the central mixing plant.

(3) The stand-by service. The ready-mixed concrete operator has the capacity to handle peak yardages which in the case of job-mixed concrete would require excessive investment in plant.

(4) Saving of space. The saving of space in congested areas is an important consideration.

(5) The convenience value; an intangible difficult to evaluate but nevertheless important. The contractor at once delegates an important part of his responsibilities for estimating, supervision, etc., to the shoulders of another.

There are many other so-called "intangibles" which might be mentioned but these should serve as illustration. Obviously these items, as well as the items of out-of-pocket costs, affect different jobs differently. In the last analysis, ready-mixed concrete must show an advantage to the user or he will mix his own concrete.

* * * * *

While the "intangibles" diminish in importance in the case of the large job, they are by no means absent in many cases. In citing some of them which we believe deserve consideration, we point out again that our principal experience has been with centrally mixed concrete.

(1) Long association of the cement, water, and aggregates produces added cohesiveness; the mass becomes more thoroughly lubricated. Cement finishers have remarked that central-mixed concrete possesses a very desirable cohesive quality which aids finishing.

(2) Consistent uniformity is obtained by central-mix methods at a concrete plant having adequate facilities for proper storage, grading, and classification of aggregates; accurate weigh-batching; regulation of temperature in cold weather; control of water-cement ratio; etc.

(3) Greater plasticity is obtained by central-mix methods due to the violent action in the initial mixer, which discharges the pre-mixed concrete into the specially designed truck drum. The following mild agitation in the revolving drum en route to the job more completely hydrates the cement and "densifies" the concrete into a homogeneous mass. The benefit to the contractor is in the easier and more economical placement of the concrete and easier finishing, which saves time and money, and in the avoidance of "stand-by" lost time both of labor and equipment.

(4) Larger pours are possible through the use of central-mix concrete where a plant of sufficient capacity is available. This is particularly true in congested districts, where job facilities are limited, and applies on both small and large jobs. Furthermore, a contractor can expand his business and work on several jobs simultaneously, without increased capital investment in mixers and equipment.

(5) Reduced labor costs are effected by the contractor when he uses central-mix concrete. He can start a pour at any hour of the day, within reason, and due to the greater yardage obtained per hour can complete the pour with little or no overtime. In wintertime this is particularly advantageous, as he eliminates the necessity of heating materials on the job and can arrange his pour during the warmest part of the day.

Philadelphia ready-mix operators have to make 64 distinct classes of concrete, often a high percentage of this total in a single day. The Warner Co. operates four central mixing plants and a fleet of 75 mixer or agitator trucks. According to the paper:

The whole service structure is presided over by the traffic manager. Assisting him at service headquarters is a staff of order clerks working at a modern telephone order turret served by four trunk lines and direct wires to all mixing plants. The order room is equipped with a teletype system, with stations at the various mixing plants, over which all orders are dispatched.

The order department is the nerve center of the distributing organization. Here all orders are received, interpreted, classified, dispatched, and followed up, and here are received inquiries, complaints, and reports from street superintendents and others. All truck assignments are cleared through this department. The whole intricate network involved in the process of delivering hundreds of batches of concrete of different proportions to their proper destinations on time is kept under this centralized control.

Each mixing plant has its own dispatching or shipping office. Orders for specific trucks are relayed to the different mixer positions and, after loading, delivery tickets are furnished the drivers. A daily truck record is kept, showing essential information covering the day's deliveries. Statistics of individual truck costs and delivery costs on each project and numerous miscellaneous items of information such as waiting time, etc., are maintained in a delivery record and cost division. That record is alive and constantly used and furnishes us with the information to keep a check upon the efficiency of the component parts of our distribution organization.

The rest of the paper dealt with testing facilities, control methods and summarized some of the technical studies made. Each plant is equipped with a complete field laboratory. Compression tests of concrete, routine cement tests, chemical tests and other special determinations are made, using the facilities of an established commercial testing laboratory. The mixing operations and necessary adjustments thereto are under the direct supervision of skilled technicians. Adequate records are an important part of control and a daily log of all batches of concrete is kept by an independent testing organization. Mr. Knopel's engineering service is available as liaison between purchaser and producer and he aids in reviewing and interpreting specifications. The whole paper was published in the February issue of the Institute's *Journal*.

H. P. THOMSON, vice-president, General Material Co., St. Louis, Mo., in a paper, "The Contribution of Ready-Mixed Concrete to the Building Industry," gave a summary of the arguments generally used to justify the industry in the eyes of architects and engineers.

### Structural Concrete

Most of the rest of the program dealt with concrete design and reinforced-concrete for structural purposes and will not be reviewed here. An afternoon session on concrete products will be found reported in the Concrete Products Section of this issue on pages 63 and 65.

## Measuring Dust Collector Performance

*(Continued from page 43)*

ratio of the volume in the section at the time of the pitot tube traverse, to the total volume at that time. The total weight per minute of the dust passing through this section of the flue during the test was then figured by multiplying this corrected section gas volume by the dust concentration found at the sampling point.

To compensate for differences in the dust loading in the gases going to the collectors, a weighted average of dust in the section was then determined. This average was obtained by multiplying the weight per minute at the time of the test by the ratio of the weight of dust caught per minute during the test to the average weight per minute of dust caught for all of the tests. The summation of the weighted average of the dust passing all of the sections of the flue thus gave the average total dust lost by the collectors per minute. The collection efficiency for the group of eight collectors was then determined by dividing the average weight of dust caught per minute during the tests, by the average weight caught plus average weight lost per minute.

Series of tests were run on both systems at different operating conditions. The results obtained, or the overall collection efficiencies were all within the range of design and requirement. The performance of the collecting, reclaiming and disposal systems is completely satisfactory to everybody concerned.

# Producing Crushed Gravel to Ohio Specifications

By J. J. GORMAN*

After considerable experimentation in methods of producing crushed gravel, a very flexible and efficient crushing arrangement has been built into the Dresden, Ohio, plant of The Zanesville Gravel Co. The main consideration was how to produce thoroughly crushed gravel which would have particles of cubical shape, especially in the finer sizes, below one inch.

Late in 1939, a Stedman 30-in. impact-type single cage Disintegrator was installed, first as a primary crusher, to test the theory of crushing by impact. The feed to the machine was hard gravel, ranging from 1- to 3½-in. size, which embraces the top sizes occurring in the pit deposit.

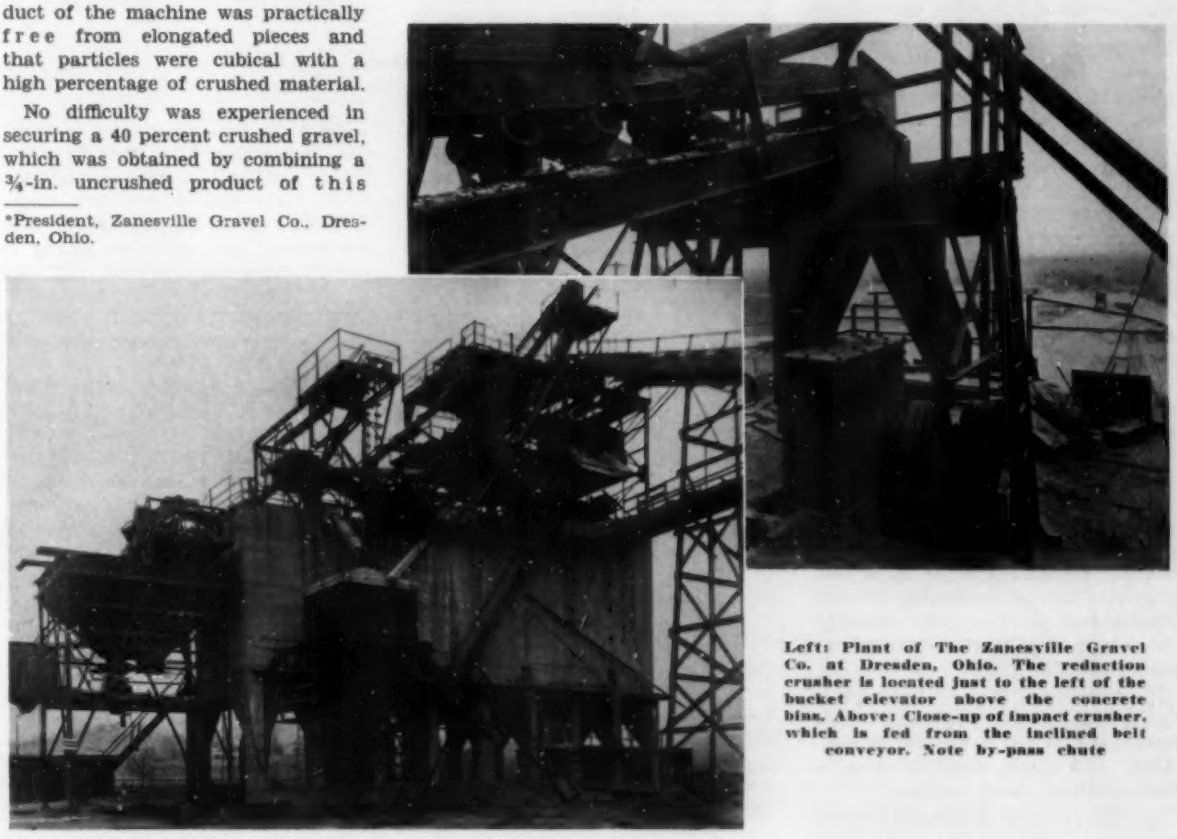
On the test run, the feed into the machine was made at an average rate of 40 tons per hour; a light feed, where the equipment was rated at 60 tons per hour by the manufacturer. It was found that the product of the machine was practically free from elongated pieces and that particles were cubical with a high percentage of crushed material.

No difficulty was experienced in securing a 40 percent crushed gravel, which was obtained by combining a ¾-in. uncrushed product of this plant with the crushed material from the "Disintegrator." Practically all material larger than ¾ in. was 100 percent crushed, with one or more fractured faces.

The installation was made on a trial basis because the company was afraid that there would be excessive wear and high maintenance costs, since the gravel is from a glacial deposit and contains about 40 percent granite. After a study of these factors and having satisfied the company that wear on the crushing members was slight, the machine was tried as a fine reduction crusher.

In this experiment, gravel retained on a No. 4 screen and passing 1 in. was delivered to the machine, which produced Ohio specification No. 46 for material ¾ in. down, showing 85 percent crushed with about 25 percent fines. It was then decided to use the crusher for taking a feed of 1¼ in. down to No. 4 in securing a 1-in., ¾-in. or ½-in. top size. The percentage of crushed material averaged about 85 percent, with close to 100 percent when producing smaller sizes, or Ohio No. 6 material which is minus ½ in.

After conducting these tests, it was decided to install a cone crusher as a primary crusher and to use the impact crusher in the tipple for secondary crushing to provide a flexible operation. With this arrangement, while furnishing paving stone, it is a simple operation to produce Ohio No. 46 (¾ in. minus) or Ohio No. 6 (½ in. down). The feed to the impact crusher on this reduction will be surplus material from 1¼ in. down. In producing either of the two specifications, the material runs 85 percent to 95 percent crushed or twice the percentage required in the State specifications.



Left: Plant of The Zanesville Gravel Co. at Dresden, Ohio. The reduction crusher is located just to the left of the bucket elevator above the concrete bins. Above: Close-up of impact crusher, which is fed from the inclined belt conveyor. Note by-pass chute

*President, Zanesville Gravel Co., Dresden, Ohio.

# Expansions in the Autoclave Caused by Magnesia

By H. H. VAUGHAN*

IN A DIAGRAM presented by A. M. Swayze in the discussion on the autoclave at the Portland Cement Association meeting in May, 1937, it was shown that the expansion of added fused MgO, 30 microns (μ) in size, was more rapid than that of the

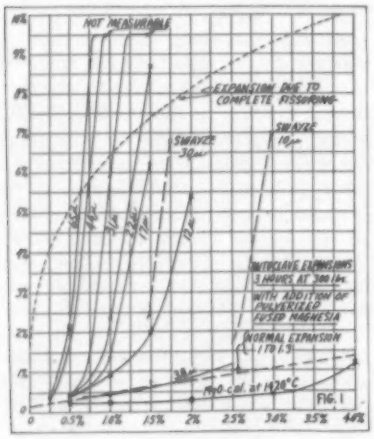



**Fig. 1: Shows a definite relation between the amount of MgO added and the expansion. Autoclave expansions are for three hours at 300 lb.**

10 micron size. This seemed anomalous as the natural inference would be that having a higher specific surface, the 10μ size would hydrate more rapidly. Some experiments made to investigate the reason for this action, have not only furnished a reasonable explanation for it, but have led to certain conclusions that are of considerable interest in connection with autoclave expansion in general. These conclusions are as follows:

A. The MgO content at which high expansion occurs decreases as the size of the grain increases. See Fig. 1.

B. Irrespective of the size of the grains, for any given MgO content of grains of equal size, uniformly spaced, the ratio of the sectional area of the grains to the area of the space between the grains is the same (see Fig. 2). This ratio divided by the square root of the grain diameter determines the MgO content at which fissuring occurs.

C. Conclusion B is of importance in connection with free CaO, which on account of the larger size of particles, will cause fissuring with a comparatively small content.

D. The analysis of particle spacing referred to in conclusion B demonstrates a ratio of the diameter of a particle to that of the including cube which is unexpectedly small, being only 4.6:1 for 1% content and varying inversely as the cube root of the content. (See Fig. 2.) When fissuring occurs, in which the cement is actually separated by the expansion of the grains, this expansion accounts for a large proportion of the expansion that actually occurs (see Fig. 1).

E. All sizes of MgO grains up to 65 microns diameter are completely hydrated in the autoclave whether exposed to steam at 300 lb. for 1 hour or 3 hours, or to steam at 200 lb. for 3 hours.

F. The progress of the fissuring as the grain size increases is far slower for 1 hour than for 3 hours at 300 lb., but once started it reaches the same amount. For 3 hours at 200 lb. there is practically no fissuring with 1% of MgO having a grain size of 44 microns while at 300 lb. pressure the expansion is too great to be measurable. (See Fig. 4.) This indicates that when the MgO is added, and there is no possibility of its being enclosed in the glass, the cement is attacked by steam at 300 lb. and any MgO present is exposed to hydration. There is no question of any difference in the MgO itself or of its complete hydration when exposed to steam.

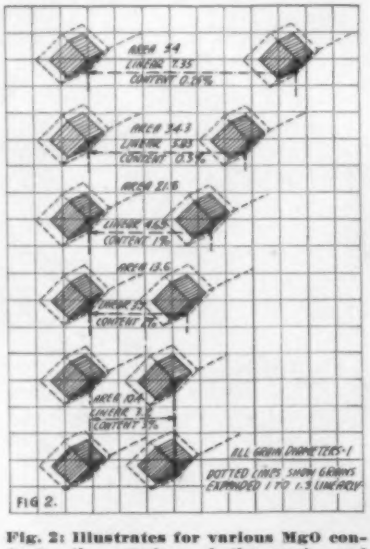



**Fig. 2: Illustrates for various MgO contents, the spacing of the grain and their size with relation to the cubic volume enclosing them**

G. The expansion of MgO by steam at 300 lb. pressure corresponds with that calculated on a linear expansion of 1 to 1.3.

H. The expansion shown in Fig. 1 is greater than can be accounted for by complete fissuring and indicates that a substantial amount is caused by the action of the steam on the cement itself.

The reasons leading to these conclusions are discussed below, the capitals in brackets indicating the paragraphs referring to each.

Pulverized fused MgO from the Norton Company was graded into fractions by the Haultain Infrasizer and the average size (microns) of each fraction determined by the Turbidimeter as follows:

| Infrasizer Size: | +56 | 56-40 | 40-28 | 28-20 | 20-14 | 14-10 | —10 |
|---|---|---|---|---|---|---|---|
| Turbidimeter Size: | 65 | 44 | 31 | 22 | 17 | 12 | 4 |

Each fraction was mixed in various proportions, from ¼% to 2.5% with portland cement containing 1.5% MgO and 0.14% free lime. Autoclave expansion was 0.181%, and composition, etc., are given in Fig. 1 and the table which follows:

ANALYSIS AND CONSTITUTION OF CEMENT

| | | | |
|---|---|---|---|
| $SiO_2$ | 21.30 | $C_4AF$ | 7.38 |
| $Al_2O_3$ | 6.59 | $C_3A$ | 13.35 |
| $Fe_2O_3$ | 2.43 | $C_2S$ | 47.08 |
| CaO comb. | 64.37 | $C_3S$ | 25.62 |
| MgO | 1.50 | MgO | 1.50 |
| SO | 1.80 | $CaSO_4$ | 3.06 |
| Insol. Res. | .12 | CaO free | .14 |
| Loss | .80 | | |
| Autoclave 3 hours | 300 lb. | | .181 |
| | 200 lb. | | .112 |

The results (A) which are shown in Fig. 1 are consistent and indicate a definite relation between the amount of MgO added and the expansion that confirms Mr. Swayze's

*Prepared by H. H. Vaughn, president of The Canadian Foreign Investment Corp., Ltd., Montreal, from experiments conducted by A. G. Fleming, chief chemist, Canada Cement Co., Ltd.

diagram. Fig. 1 also shows the curves for MgO calcined at 1420 deg. C. and two other curves which will be referred to later.

In these experiments (A) the MgO was thoroughly mixed with the cement and its distribution (B) was reasonably uniform. Under this condition (D) each volume of cement will contain approximately the same volume of MgO and as the grains are of uniform size, it is possible to picture their relation to the volume containing them. This is easily calculated by considering a cube of side 10 and volume 1000. In such a cube p % of MgO will occupy a volume of 10.p or a cube having a side $^3$ 10 p or say = G. This relationship is evidently independent of the grain size of the MgO so that if G is the grain diameter, the ratio of the diameter of the grain to the side of the cube is G to 10 and that of the area of the grain to the face of the cube is $G^2$ to 100. This is the area that has to be

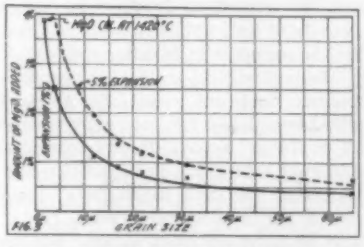



**Fig. 3: Cement with additions of fused MgO autoclaved 3 hr. (5 hr.) at 300 lb. In the curves, "o" and "x" show percent of MgO of various sizes causing expansion of 1 percent and 5 percent. Curves are calculated as follows: Let R = Ratio of MgO in section to area of section. Then fissuring occurs as follows: To 5 percent expansion when R = 4NG; to one percent expansion when R = 6NG, where $G_\mu$ = Diameter of MgO grains**

broken apart by the expansion of the grains to cause fissuring.

Fig. 2 illustrates for various MgO contents, the spacing of the grains and their size with relation to the cubic volume enclosing them. The size of the grain relative to both the distance between them and their area to that of the face of the cube is far larger than would be expected with such small contents. Fig. 2 also gives their ratio for all the contents

| MgO Content % | Linear Ratios Grain Side | Grain Side | Ratio of Areas Grain Face | Face Grain |
|---|---|---|---|---|
| 0.25 | .136 | 7.35 | .0185 | 54 |
| 0.5 | .171 | 5.85 | .0292 | 34.3 |
| 1.0 | .215 | 4.65 | .0462 | 21.6 |
| 1.5 | .246 | 4.05 | .060 | 16.6 |
| 2.0 | .271 | 3.7 | .0734 | 13.6 |
| 2.5 | .292 | 3.4 | .0853 | 11.7 |
| 3.0 | .310 | 3.2 | .0961 | 10.4 |

now considered as shown in the tabulation identified "Linear Ratios—Ratio of Areas."

### Effect of Particle Size on Fissuring

While a variation in the size of the grains would not affect the point at which their expansion broke down the resistance of the material between them if that were homogeneous, as for the same content all dimensions would be similar, it is evident from Fig. 1 that it has an important effect in a granular material such as cement, and that as the size of the grains increases, fissuring occurs with a smaller ratio between the area of the grains and the surface between them.

**CHEMISTS' CORNER**

**Problems and practices of the chemists in the industry are discussed on these pages. Contributions and comments are invited.**

To determine the extent of this influence (A), the MgO content at which the expansion lines in Fig. 1 cut the lines at which 1% and 5% expansion occurred were plotted in Fig. 3, the "x" and "o" marks showing the MgO contents referred to the grain size. It was found that the fissuring occurred when the area of the grain multiplied by the square root of its diameter bore a constant ratio to the area of the cement in the section, or in other words that as the size of the grain increased its effect increased in proportion to the square root of its lineal size. The curves in the diagram are plotted on this assumption and are so remarkably consistent that evidently with the limits of grain size in these experiments, covering from 4 microns to 65 microns diameter, they are reasonably accurate.

This relationship (G) is of interest in connection with the damaging effect of free lime which occurs in large grains 60 microns or more in diameter as compared with the small grains, seldom exceeding 10 microns or 12 microns, for MgO. With the large grains fissuring would commence with a content of 0.5% as against 1% or more for the smaller ones or about one-half.

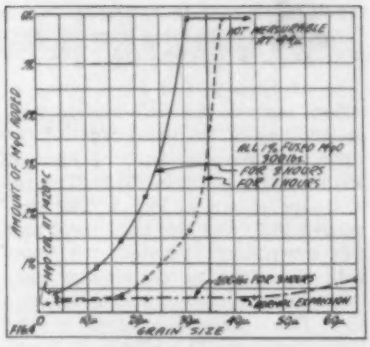



**Fig. 4: Cement with additions of one percent of MgO of various grain sizes autoclaved 3 hr. at 300 lb., one hour at 300 lb., and 3 hr. at 200 lb.**

### Reasons For Expansion

Fig. 2 also explains to a partial extent the reason (A) why such large expansion occurs with comparatively small additions of MgO in the autoclave. With a content of 1% the diameter of the grain is 21% of the distance from grain to grain. When hydrated the grain expands linearly in the ratio of 1 to 1.3 or from 27 to 27.3, an expansion of 6.3 percent. With complete fissuring from grain to grain, the bar expands in the same ratio, in place of the normal expansion caused by the MgO alone which would be 0.3 percent.

That this explanation (D) of high expansion is reasonably correct is supported by the increase in weight of bars showing high autoclave expansion (G) being practically the same as the expansion, but returning to the original weight after drying. This indicates the existence of cracks or fissures as above described. The curve marked "complete fissuring" (D) in Fig. 2 is based on an expansion of 1 to 1.3 for the percentages of grains per unit length (G) as calculated above. This is evidently less than the maximum expansion (G) that actually occurs, and it would appear that a proportion is caused by the expansion of the MgO in the cement, which while protected from hydration under normal conditions

GAIN IN WEIGHT (PERCENTAGE)

| CONDITION OF TEST | 65μ | 44μ | 31μ | 22μ | 17μ | 4μ | MgO 1420°C |
|---|---|---|---|---|---|---|---|
| 3 hours at 300 lb..... | 43.9 | 43.2 | 41.3 | 42.2 | 42.0 | 42.2 | 41.9 |
| 3 hours at 200 lb..... | 43.4 | 43.8 | 41.2 | 41.9 | 42.1 | 39.4 | 44.1 |
| 1 hour at 200 lb..... | | 42.7 | 41.8 | 41.2 | 42.1 | 39.4 | 40.5 |

($\mu$ = micron)

becomes exposed to hydration when fissuring is started and adds its MgO content to that of the MgO added.

In addition to test for 3 hours at 300 lb., tests on the same cement with an addition of 1% fused MgO of various sizes were made for 1 hour at 300 lb. and 3 hours at 200 lb. The results are shown in Fig. 4. The pulverized MgO was also autoclaved and was completely hydrated, the lower gain in weight in the smaller particles being probably due to impurities. The results are given in the table beginning "Condition of Test" on the preceding page.

In Fig. 4 it will be noted that comparing 1 hour at 300 lb. with 3 hours at 300 lb., the fissuring is decidedly less up to a grain size of 31 microns, but at a grain size of 44 microns the expansion is "not measurable" in both cases. In those experiments the MgO is simply mixed with the cement, it is not enclosed in the glass, but simply surrounded by the 24-hr. set cement, and if exposed to the steam would be as fully hydrated in 1 hour as in 3 hours. It is definitely clear that for 3 hours at 300 lb., the cement is attacked to an extent that exposes the MgO to hydration, whereas for 1 hour, the attack has not progressed sufficiently to effect this result. The part of the diagram above 17 microns does not apply to cements in practice and the result on mixture on this size and smaller is definite.

The tests at 200 lb. exhibit the same characteristics but to a far greater extent. Practically no fissuring occurs with grain sizes that are found in cement, and as the MgO would hydrate to the same extent if exposed, the difference in behavior is unquestionably caused by the delayed action of the steam on the cement itself. This agrees with experiments made on cements with various MgO contents, exposed to various pressures for various lengths of time and while these were explained in the theory that they indicated a difference in the protection afforded by the glass content of the cement, it would now appear that the variation is dependent on the action of the steam on the set cement.

All the experiments on which this article is based were conducted by A. G. Fleming, chief chemist of the Canada Cement Co., Ltd., to whom the writer wishes to express his sincere appreciation for the large amount of work performed and the accuracy with which the tests were conducted, which is amply demonstrated by the uniformity of the results.

# Lime Putty Developments

REPRESENTATIVES from 10 of the 12 Brooks-Taylor lime putty plants in operation were present at the 1940 annual meeting of the Lime Putty Plant Operators' Association held in Washington, D. C. Stanley Smith, Concrete Construction and Supply Co., Columbia, S. C., was elected president and Herbert Jahncke, Jahncke Service, Inc., New Orleans, La., is the new secretary-treasurer. The new officers succeed Irving Warner, and Hayden Brooks who served the Association as president and secretary, respectively, since its organization in 1937.

Operating practices and marketing policies were the subjects covered at the meeting, using the round table discussion approach to develop information of interest. It developed that several methods are successfully used to eliminate water pockets in lime putty ageing tanks. The practice is to drain water in or near the filters from the filters each day before putty is withdrawn from the tanks. Where pockets in fissures occur some distance from the filter, they are broken up by injecting compressed air momentarily through the bottom of the tank or by forcing a pole down through the putty from the top of the tank.

A discussion of the effect of freezing on lime mortar was timely, since freezing temperatures were encountered in all geographical sections this past winter. It was conceded that mortar which is frozen hard under conditions permitting the moisture to be driven from the material is ruined and beyond salvage. On the other hand, mortar subjected to only slight freezing, or mortar that has been frozen and thawed quickly, is not seriously injured. It is easy to recognize mortar that has been damaged by freezing and thus to prevent damaged mortar from being used in walls.

Stanley Smith, new president, Lime Putty Plant Operators' Association

### Proportioning By Weight

Specifications have long required the mixing of mortar to be done by volume proportions, such as 1:1:6 (one part putty, one part portland cement and six parts of sand). The disadvantage is that this permits a wide variation in actual proportions, which can be remedied largely by using pounds of lime solids instead of volumetric measure in making mortar.

The volumetric method of proportioning does not take into account whether a cubic foot of putty weighs 82 or 74 lb. per cu. ft. for example. Accurate mixtures can be obtained by reducing the lime solids in a cubic foot of putty to a weight basis. It was also brought out that mortar can be improved by using a good grade of sand, having closely-controlled percentages of 50-mesh and 100-mesh particles.

### Yields in Relation to Methods of Making Lime

The experience of lime putty producers reveals that the answer to the controversy regarding the comparative yields of rotary kiln lime and shaft kiln lime is for all practical purposes identical. Rotary kiln lime will usually produce more putty, say 100 cu. ft. per ton of lime, but it weighs less than the putty made from shaft kiln lime. But the total lime solids in 100 cu. ft. of putty made from a ton of rotary kiln lime about equals that of a putty made from shaft kiln lime which might have produced only 80 cu. ft. of aged lime putty.

Following the formal meeting, a demonstration of apparatus developed to determine the sand carying capacity of mortar was witnessed at the plant of the Super Concrete Corp. The apparatus was built by the Warner Co. according to designs made by Prof. Walter Voss of the Massachusetts Institute of Technology and the demonstration was conducted by Warner technicians.

# Classifying To Improve Sand Grading

**Article 12 on washing and classifying sand describes methods of improving grading by adding fines or removing intermediate sizes**

By EDMUND SHAW

ONE OF THE first plants built in the United States for improving the grading of sand by classifying it into fractions, and combining them in such proportions as to give the desired grading, was designed by John Prince, president of the Stewart Sand and Material Co., Kansas City. There were five classifiers, of the writer's design, in series, taking the discharge from a 10-in. dredge pump. Later it was found that three classifiers would be enough for almost any grading that might be wanted, and three would be better than five, as classifiers work better when the discharge is not too small.

The sand which was taken out was reclassified and sold for industrial uses. Being high in silica it could be used instead of "straight" silica sand for many purposes.

These classifiers had rising currents of clear water, advantageous not only for making the separations, but also for washing out the clay that

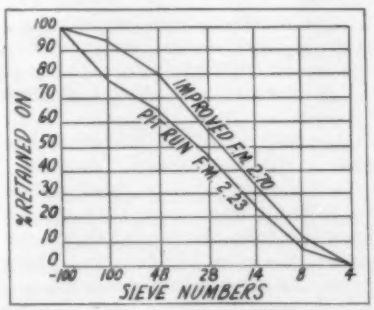



**Fig. 1: Shows graph of sieve analyses of sand with too low a fineness modulus to make a good fine aggregate and graph of grading after it had been improved by separating into fractions and recombining the sand gradings**

came with the sand. They were very successful in this, confirming the writer's belief that a rising current of clear water is perhaps the most effective method of washing. This plant was described in ROCK PRODUCTS, April 17, 1926 under the caption, "Plant that Looks like a Still." A later article was published February 19, 1927.

Subsequently a classifier was designed for a Lake Michigan sand dredge, a simple surface current classifier with three pockets. This was successful in making the desired grading, but it was not commercially profitable because the amount of sand pumped that had to be wasted to get the desired grading was so large. The proportion of waste should be carefully determined before building a plant to do such work.

All improving of the grading of sand by classification or screening must be by subtraction, and that means there will be some loss. But in almost every locality a use can be found for this waste; sometimes it may be sold as engine sand, plaster sand or steel moulding sand at higher prices than the concrete sand from which it was taken.

Improvement of grading by addition is also a very common practice, now that the necessity of having enough fines in concrete sand is understood. Asphalt sands and fine silica sand are often produced or bought for this purpose. The fines are often the overflow products of classification, stored and added as the purchaser desires.

### Example of Gradation Improvement

Fig. 1 shows the graph of a sieve analysis of a sand with too low a fineness modulus to make good fine aggregate; and the graph of a grading after it had been improved, by separating into fractions and re-combining in the right proportions. This and the next figure are drawn from curves in the Concrete Manual of the U. S. Bureau of Reclamation.

Inspection shows that this sand might have been sufficiently improved by one classification, taking out part of the sizes from 28- to minus 100 mesh. Probably two classifiers in series would do the work better, and if only one was used, it might be necessary to bypass a part of the feed to retain the necessary fines.

The trouble with the grading is that there is too much passing 100, some 22 percent. If this was reduced to 5 percent, as shown, the curve would move up to give a grading with the required fineness modulus. Care would have to be taken not to lose too much of the 48- to 100-mesh size, as some specifications require 15 percent passing 48-mesh.

Fig. 2 shows a natural sand with too low a fineness modulus, 2.48, which it is desired to raise to 2.75. Here the excess is in an intermediate size group, 28- to 48-mesh, 37 percent. If this could be reduced to 23 percent the curve would move up as shown to the F. M. 2.76 line. In classifying it would be necessary to take some from

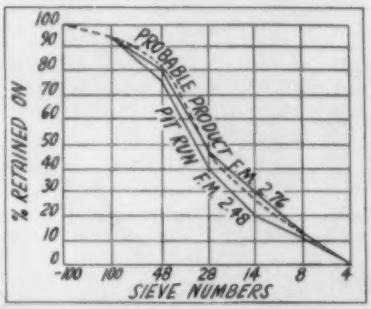



**Fig. 2: A natural sand with too low a fineness modulus which was improved by removing part of intermediate size**

the adjacent size groups, so the actual curve would probably be something like that shown by the dotted line, which has the same fineness modulus and more than the required 15 percent between 48- and 100-mesh.

### Many Sands High in Intermediate Fractions

This shows that it is not enough to have a classifying system that will take off the end of a grading; it is necessary to reduce the intermediate portion to improve some gradings. Probably there are as many sands with too much in the intermediate fraction (after the clay and silt have been removed) as there are with too much in the fine fraction. This is especially noticeable in the sands of some fluvio-glacial deposits which are important because they are near to well-settled areas. Not many river sands commercially operated outside the glaciated areas, have this defect.

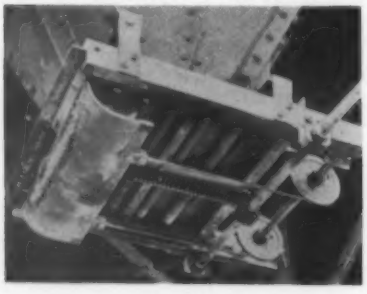
*(To be continued)*

# Hints and Helps

## ★ FOR SUPERINTENDENTS ★

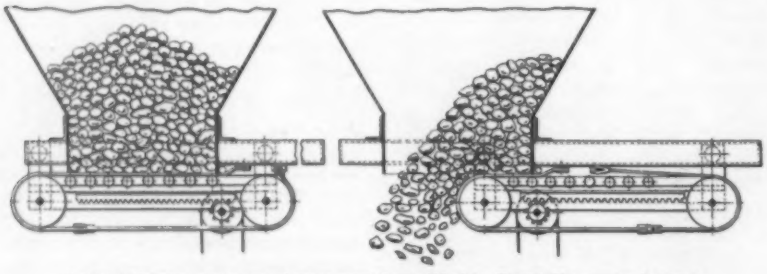
### Hopper Gate Which Will Not Jam

F. P. PATENT CLOSURE DEVICES, LTD., London, England, has designed what is said to be an entirely new



Looking at under side of new type hopper gate

type of hopper gate that will not jam, and will permit controlled output without friction. The illustrations show how the gate operates.



Left: Hopper gate in closed position. Right: Partially opened gate

Instead of a sliding plate either fixed horizontally or on trunnions, the gate comprises a rubber or steel apron introduced between the material in the hopper and gate frame. This apron is tensioned over rollers, positioned on a carriage which is moved by a rack and pinion arrangement operated by means of a chain or capstan wheel. The apron is held firmly against the hopper mouth when in the closed position by the series of small rubbers.

### Protecting Threads When Handling Pipe

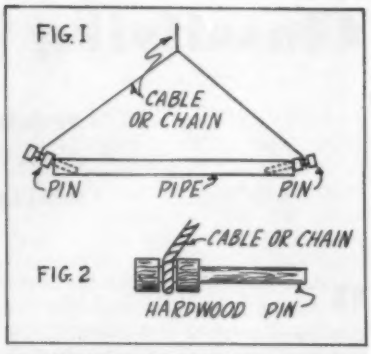
By W. F. SCHAPHORST

WHEN HANDLING HEAVY PIPE or other similar equipment mechanically, a common method is to use steel hooks on the ends of the cable, chain, or rope. These hooks are hooked into the ends of the pipe, or into any convenient opening, often resulting in battered threads. If the pipe is provided with nipples the internal threads of the nipples are almost certain to be battered to some extent, and even where the threads are external they are frequently damaged.

Because of the battered threads, considerable extra time is consumed by the pipe fitters in making things right, or in forcing the fit. In fact, damaged pipe threads of this type may result in leakage, for reasons that every pipe man knows.

The accompanying sketch, Fig. 1, shows how to avoid this battering. Two hard wood pins, turned as indicated in the detail sketch, Fig. 2, will prevent metal from coming in contact with the threads. Simply insert the ends of the pins into the pipe as shown in Fig. 1 and let the hoist do the rest. This method is just as quick as with metal hooks, and is certainly far preferable.

Of course this "pin method" is not applicable to all equipment, but it is hoped that this kink will prove helpful in suggesting solutions for any handling problem involving thread protection.




Showing how pipe threads are protected by means of hardwood pins when pipe is suspended by chain or cable

### Lifting Side of Crane Without Jacks

By ROSS WHEELTON

RECENTLY when one of the caterpillars on our crane needed repairs we found that a jack sufficiently heavy was not available.

This difficulty was overcome, however, by the following method. The boom was lowered almost to the ground, the clam bucket filled with stone to provide additional weight and both drums dogged with the bucket held one or two feet from the ground.

The boom was then swung to the side opposite to that which was to be raised. This lifted the caterpillar clear of the ground and it was found possible to adjust the height of the caterpillar from the ground by the use of the boom hoist.

Precautions must be taken not to have the bucket more than one or two feet from the ground before the boom is swung to the side, otherwise the machine will be upset.

Showing how repairs to caterpillar tread on crane were made without using jacks

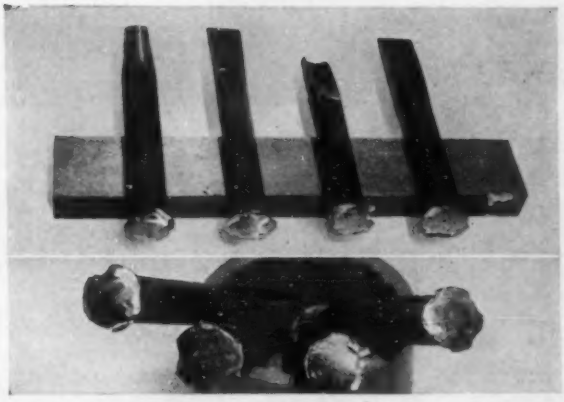


Fig. 1: Showing chisels, the striking ends of which are battered, cracked, and mushroomed

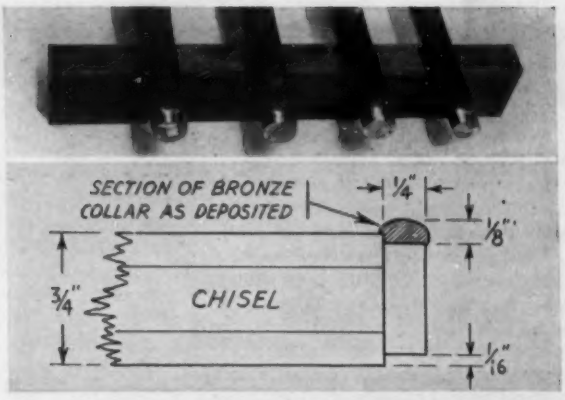



Fig. 2: Striking ends are ground down to sound metal and shoulders are ground as shown in sketch

Fig. 3: A layer of bronze, ¼-in. to ⅝-in. wide and ⅛-in. deep is built up along ground shoulder

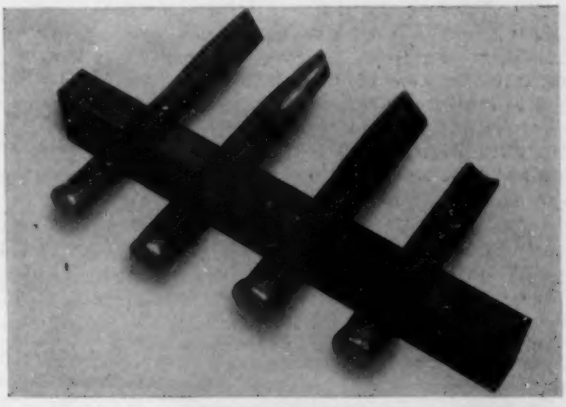


Fig. 4: After chisels have been cleaned, the striking ends are dressed square by grinding

This method will not work with full-revolving machines, but with the type of machine in the illustration it will be found quite satisfactory.

## Bronze-Welded Band Makes Chisels Safe

EVERYONE is familiar with the worn, unsafe condition of the ends of chisels so often found on the job. In a recent issue of *Oxy-Acetylene Tips*, published by Linde Air Products Co., an interesting method of "safe-ending" chisels and drills was described and illustrated.

As soon as spalling of the ends of chisels begins to develop, the impact of any hammer blow is likely to send a steel chip flying, causing a painful injury. Hand injuries also are frequently caused by a hammer blow deflected from the irregular, mushroomed striking end of a chisel or drill bit.

To make the ends of chisels safe, the spalled and cracked striking end is cut down to sound metal, and a small shoulder, as shown in Fig. 2, is ground all the way around the cut end. A reinforced band of bronze is then deposited on this shoulder, by means of the oxy-acetylene blowpipe, and the striking end of the tool is ground square, completing the safe-ending application.

The four ¾-in. chisels, shown in the illustrations, were safe-ended in 25 min. About 24-in. of ⅛-in. Oxweld No. 25 M. bronze welding rod and a small amount of Brazo flux were used. Gases consumed totaled approximately 3 cu. ft. of oxygen and slightly more than 1 cu. ft. of acetylene for both cutting and welding.

## Repairing Movable Linings of Crushers

A CRUSHED-STONE PRODUCER in France wrote to ROCK PRODUCTS seeking a method of attaching the parts of the movable lining of gyratory and jaw crushers in which the normal zinc filling and binder was replaced by some kind of a special cement. Since other companies in this country may be interested in the method recommended by the principal crusher manufacturers, the answer to this query is given below.

It is a fairly common practice to fill in the panel on the back of the concave of a gyratory and the jaw plate of a jaw crusher with ordinary portland cement concrete, using a mixture of three parts of hard rock, one and one-half parts of sand, and one part of cement. This concrete is applied and allowed to harden for two or more days. High-early-strength cement is used when a rush job is to be done, in which case plates may be installed the next day.

In order to avoid an explosion when zincing these concrete filled concaves in place, due to the moisture in the concrete, the surface is brushed with boiled linseed oil. After that they are set in the crusher and zinced in the usual way.

The object of the concrete filling, of course, is to reduce the amount of zinc needed to hold the plates or concaves. This is not only on account of the first cost but also to avoid excessive shrinkage of the zinc backing. With an excessively thick zincing, the concaves are not tight and they may move about for some time. This is avoided with the concrete filling because the zincing is not more than a half-inch thick and the shrinkage of this amount of metal is negligible.

# NATIONAL ASSOCIATION ACTIVITIES

## Ready Mixed Concrete

STANTON WALKER, director of engineering, National Ready Mixed Concrete Association, has sent out a letter ballot on the proposed tentative Standards for Operation of Truck Mixers and Agitators. These proposed standards are for the purpose of replacing Tentative Standards and Recommended Practices for Truck Mixers and Agitators of Revolving Drum Type promulgated under date of May, 1937, and Tentative Standards and Recommended Practices for Truck Mixers and Agitators of Open Top, Revolving Blade Type promulgated under date of August, 1939, and to incorporate recommendations presented to the committee covering Tentative Standards and Recommended Practices for Truck Mixers and Agitators of Revolving Inclined-Conical-Drum Type. Under the new proposed standards, one set of recommendations will cover the several types of mixers. These new standards were adopted at a joint meeting of the Board of Directors and the committees at the recent convention in St. Louis, and were reported in ROCK PRODUCTS, February, 1940, page 46.

## Indiana Association Elects Officers

AT THE RECENT ANNUAL CONVENTION of the Indiana Mineral Aggregates Association on March 7, the following officers were elected for one year terms: President, C. H. Purdum (sand and gravel), Sturm & Dillard Co., Syracuse; vice-president, George H. Balfe (crushed stone), Monon Crushed Stone Co., Monon; vice-president, Edward F. Healey (slag), France Stone Co., South Bend; secretary-treasurer, L. F. Hart, Wabash Sand & Gravel Co., Terre Haute. The following directors were elected for two-year terms: W. C. Babcock, W. C. Babcock Grain Co., Rensselaer, to represent the crushed stone industry in the first district; M. A. Neville, Western Indiana Gravel Co., Lafayette, to represent the sand and gravel industry in the third district; C. M. Herriman, Mid-West Rock Products Corp., Indianapolis, to represent the crushed stone industry in the third district; C. Gray, American Aggregates Corp., Indianapolis, to represent the sand and gravel industry in the fourth district; N. E. Kelb, Ohio & Indiana Stone Co., Indianapolis, to represent the crushed stone industry in the fourth district; Bert Koenig, Koch Sand & Gravel Co., Evansville, to represent the sand and gravel industry in the fifth district; and R. W. Meisinger, Hy-Rock Products Co., Marengo, to represent the crushed stone industry in the fifth district.

S. C. Hadden, executive secretary, reported on the status of seasonal exemption. The following has been taken from this report:

Mr. Hadden referred to his appearance before the examiner representing the Wage-Hour division in Washington, D. C., last summer. He said in part, "It was our purpose at Washington, as a representative of both industries, to join their interests together in this matter, feeling that in this as in many other things the two must go up or down together. . . . We felt that both industries were entitled to seasonal exemption, but doubted if either would get this recognition because of the reluctance of the Wage-Hour division to grant such exemptions to any industry. We were surprised when seasonal exemption was recommended for a limited sand and gravel producing area without granting equal consideration to the crushed stone industry and to the sand and gravel industry in contiguous areas. We recognize that this whole subject is still under consideration, and we are hopeful that our original recommendation may finally be adopted and that both industries in Indiana will ultimately be recognized as seasonal throughout the entire State and including operations on the Ohio River."

### COMING CONVENTIONS

**National Concrete Burial Vault Association, Netherland Plaza Hotel, Cincinnati, Ohio, May 7, 8 and 9.**

**National Lime Association, Drake Hotel, Chicago, May 21, 22 and 23.**

**National Industrial Sand Association, The Greenbrier, White Sulphur Springs, W. Va., June 13 and 14.**

## Industrial Sand

EXECUTIVE SECRETARY, V. P. Ahearn in a recent letter to the member companies stressed the importance of attendance at the coming convention of the National Industrial Sand Association at Greenbrier Hotel, White Sulphur Springs, W. Va., June 13 and 14. Forms for advance reservations will be sent out by the hotel.

One of the important problems up for discussion will be ways and means of meeting competition from duty-free importations of silica. This involves the recent decision of the United States Customs Court, in a case presented by L. A. Salomon and Brother, which permitted the importation of silica without the payment of duty.

## Lime

NATIONAL LIME ASSOCIATION has asked for the coöperation of all members in promptly returning the report forms recording the total tonnage of quicklime and hydrated lime manufactured and sold by them during the calendar year 1939. When these reports have been received, the total tonnage for each district will be used in determining the number of directors to be elected to serve during the new fiscal year beginning July 1, 1940.

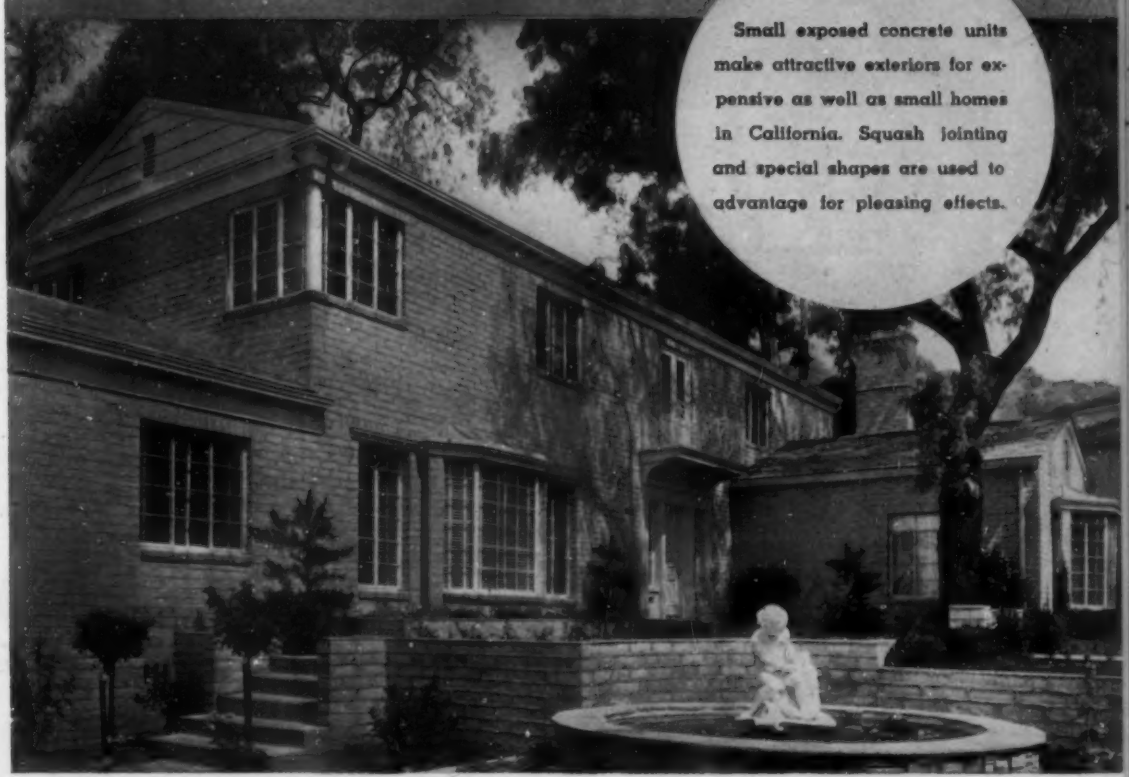
## Seasonal Exemption Is Now Effective

ANNOUNCEMENT has come from Washington, D. C., through the National Sand and Gravel Association that the Federal Register has published the announcement of Administrator, Philip B. Fleming, Wage and Hour Division, that the seasonal exemption of the sand and gravel industry covering the Northern Branch became effective on March 8, 1940. For those who wish to refer to the Determination of the Examiner, Harold Stein, and the exact areas covered by the exemption, the complete report appeared in ROCK PRODUCTS, February, 1940, p. 43.

The only slight difference between the provisional order sent to member companies on January 24, 1940, and the order of the Administrator as issued in the Federal Register is that Rockland County is added to the non-exempted area in New York State.

# CONCRETE PRODUCTS AND CEMENT PRODUCTS

## *Jointing Accentuates Concrete Masonry*

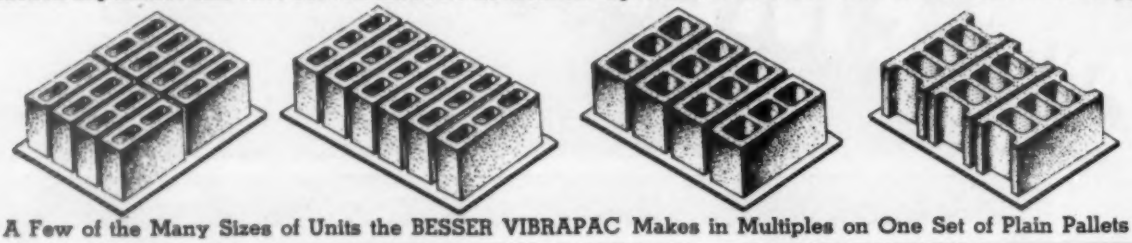


Small exposed concrete units make attractive exteriors for expensive as well as small homes in California. Squash jointing and special shapes are used to advantage for pleasing effects.

# PRODUCTION EXPERIENCE

## Has Proven
### the Superior Qualities of Besser Vibrapac Blocks

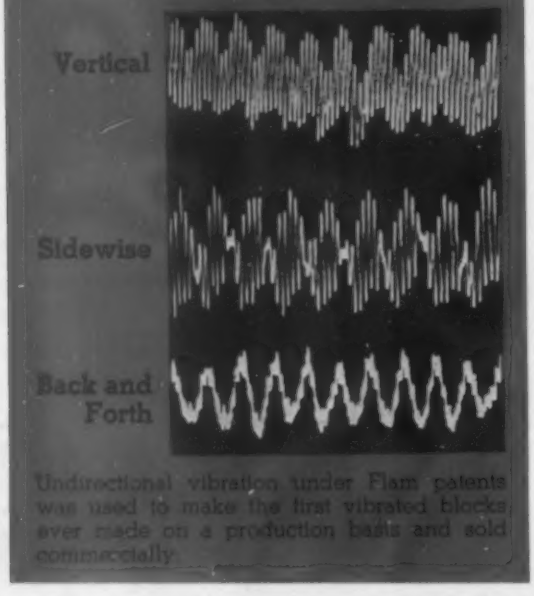
**Production Experience Has Also Proven the More Economical Operation of BESSER VIBRAPAC Plain Pallet Strippers**



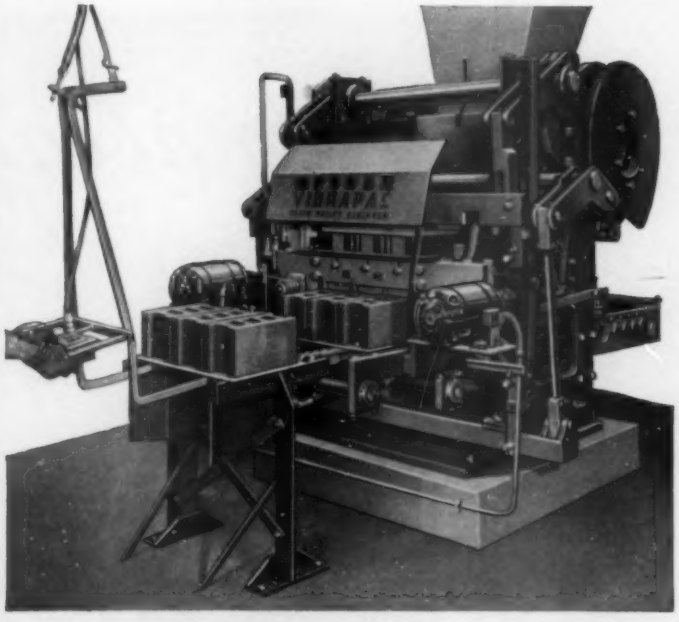
**A Few of the Many Sizes of Units the BESSER VIBRAPAC Makes in Multiples on One Set of Plain Pallets**

SCIENTIFIC RECORDING of undirectional vibration as utilized under Flam and other patents, and patents pending, by Besser Vibrapac Plain Pallet Strippers.

Photograph shows vibration impulses for one second as recorded by light beam on motion picture film, magnified nine times.




Undirectional vibration under Flam patents was used to make the first vibrated blocks ever made on a production basis and sold commercially.




**BESSER** SUPER VIBRAPAC PLAIN PALLET STRIPPER

100% Automatic. Extremely simple. The Vibrapac combines fully patented vibration principles with the exclusive Besser Plain Pallet principle. Automatic pallet feeding and one man electric offbearing device. Production capacity 600—8 x 8 x 16 blocks per hour. 8 x 8 x 16 blocks made 3 at a time on one Plain Pallet. Other sizes made in multiples on same set of pallets.

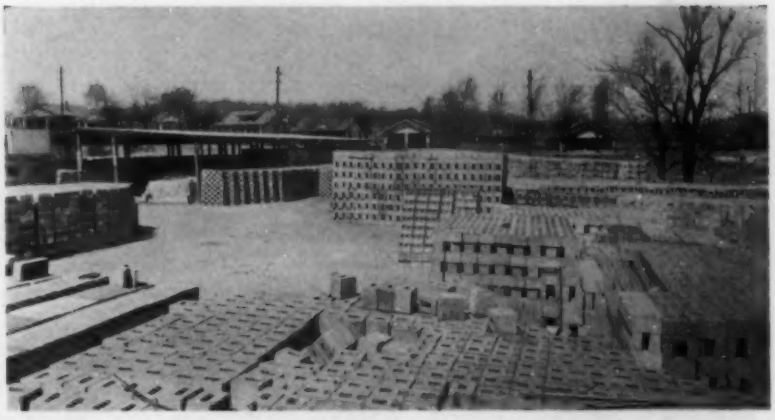
## BESSER MANUFACTURING COMPANY

**COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS**

*Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND*

**204 40TH STREET, ALPENA, MICHIGAN**

THE SAVING IN PALLET COST WILL PAY FOR A BESSER VIBRAPAC PLAIN PALLET STRIPPER



Covered storage and daylighting in open stockpiles aid proper curing at plant of Southern Cast Stone Co.

By BROR NORDBERG

# "If It's Concrete We Make It"

**That's the business policy of the Southern Cast Stone Co. Architects and builders get the fullest cooperation through the facilities of the company's engineering department**

ONE OF the most versatile concrete products concerns in the country is the Southern Cast Stone Co., Inc., Knoxville, Tenn. Under the able direction of J. W. Warren, general manager, the company has developed along the lines of diversification and is enjoying a thriving business.

Mr. Warren got his start in the concrete products business back in 1917 when he set up two Walter concrete tile machines in an old cow barn outside of Johnson City, Tenn. A third roofing tile machine and equipment for making concrete block were installed in new quarters built a year later. Cast stone was added in 1918 and, in 1920, Mr. Warren organized a new company, the Watauga Cement Products Corp., located in Johnson City. This was a successful enterprise but in a limited market area so the business was moved to Knoxville.

Cast stone, roofing tile and concrete stave silos were manufactured until 1933. At that time Norris dam was being built and Norristown was springing up. Southern Cast Stone Co. got its start in concrete houses by building 150 low-cost concrete houses for Norristown. Some of them had floors of precast cinder concrete slabs. Since that time, cinder concrete products have been the main business, and more recently products made from Superock expanded slag, have been added.

Southern Cast Stone Co. now has built up a dealer organization and ships units, principally by truck, north into Kentucky, east as far as Asheville, N. C., south to Chattanooga and west into Tennessee, within a radius of 120 miles. About 75 percent of all sales are made through dealers and all deliveries are made in hired trucks.

### Diversified Line of Products Builds Volume

The principal volume of business is the sale of backup units for large structures, such as industrial buildings, garages and schools. The popular units for this work and exteriors is a 4- x 5- x 8-in. cored block and some 8- x 8- x 12-in. units. About 1,100,000 of the smaller units were sold in 1938 and 170,000 of the other.

Left: Carborundum power saw used to cut standard concrete slabs to exact required size. Right: This joist machine has vibration applied at both ends to avoid dampening of vibration at the ends in casting long, heavy members

Small specials are cast in multiples as shown using an air hammer to compact the semi-dry concrete mix

Other products are concrete joists, plain floor slabs, colored floor slabs, roofing tile, septic tanks, brick-faced block, chimney block, stone-faced block, concrete silos, bird baths, benches and others. Septic tanks and the floor and joist system, of I-beam and precast slab construction, are of original design. The floor system is made from sand and Superock aggregates and the stone silos and septic tanks of hard siliceous aggregates. Cinder block silos are sold as insulating silos, with the resistance of cinder concrete to heat transfer stressed.

Cinder block basements are common in this territory, cinder block being sold for this construction with the recommendation that cement paint be applied over an asphalt emulsion coating. Below grade, it is suggested that the wall be given a brush coating of Flintcote cold-mixed with water.

The company has its own engineering department which, aside from making up shop drawings, is of great benefit to architects and builders as a service department in developing setting up plans, suggested construction details, etc.

### Manufacturing Plant

The plant is really two separate units, consisting of one building for machine-made block with steam curing kilns and cinder crushing equipment, and a large, separate building where all other units are made. About 60 cu. yd. of cinders are handled daily through a crushing plant consisting of a New Holland hammer mill and a double set of 10- x 16-in. New Holland rolls. Cinders are trucked to the plant and then elevated and put over a screen with ⅜-in. openings punched in perforated plate. Oversize enters the crushers, the product being recirculated over the screen. Tramp iron is removed by a magnetic conveyor just ahead of the screen. The grading is from ⅜-in. down for the manufacture of concrete block.

Block are manufactured on a modernized Anchor machine which makes two 8- x 8- x 12-in. units per cycle or seven per minute. Entrance into each of four curing kilns is but a step away from the machine and the off-bearers stack the units directly on to racks inside the kilns. Steam curing is done overnight and through the following day before removal by a hand-cart into yard storage.

### Covered Storage Reduces moisture content

Mr. Warren is a believer in proper yard curing conditions. He has provided covered storage with a galvanized iron roof over the stockpiles of common unit sizes. As shown in the illustration of the storage yard, units are piled according to a definite plan and daylighted so that air can get to all the blocks. No deliveries are made without a minimum yard curing period of 28 days.

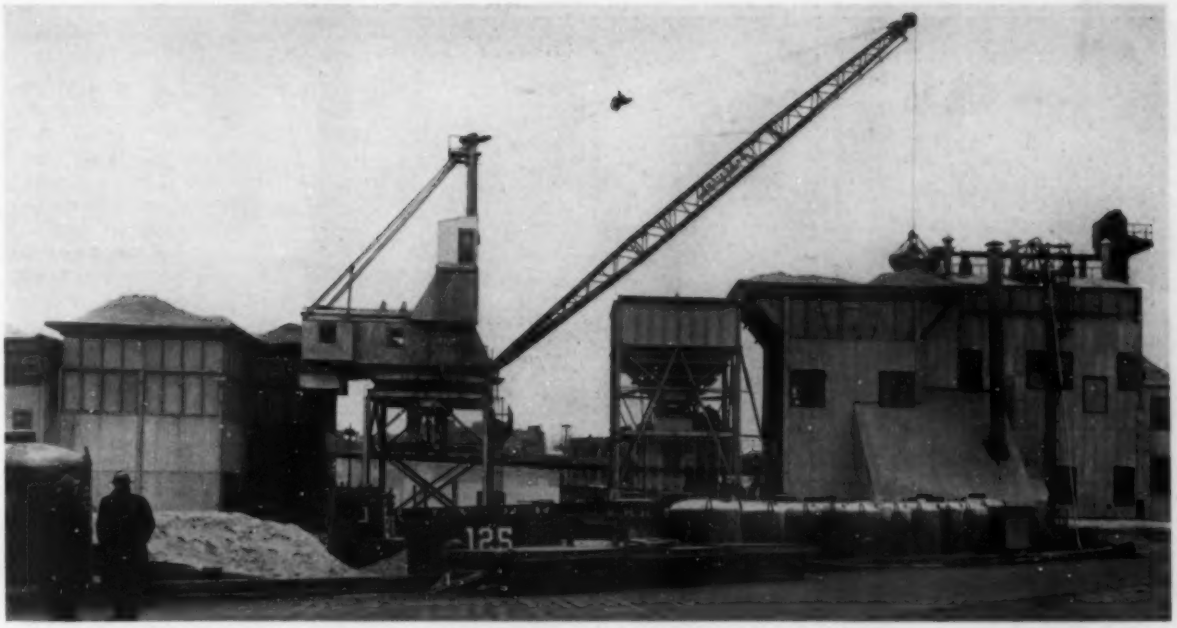
Modern methods are also utilized in the manufacture of other concrete products. Reinforced concrete floor slabs, 30-in. square and 2-in. thick, of Superock concrete are cast on vibrating tables. Generally, they are cast plain but on occasion they are made with a colored top face by casting them in live rubber molds. The colored facing is a mix of river sand, oxides and water-proofing cement.

Joists are manufactured, up to 26 ft. in length, on a vibrating table using gang molds. The machine was built by Mr. Warren and depends for its vibrating action on off-center discs. However, as joists of greater depth than usually made in a concrete products plant are cast on this machine, it was built with a vibrating mechanism near each end, both V-belt driven from a single electric motor at the center. This arrangement insures uniform vibration of sufficient strength out to the extremes, where with a single vibrator the vibrations would be dampened.

Hand made units, such as sills, lintels, special solid units, etc., are produced in special molds, using an air hammer to compact the semi-dry mix concrete. One of the illustrations shows how seven 4- x 8- x 14-in. units are made, using spacers in a single mold.

These units are stripped immediately after they are made and are left standing on the pallet, usually for a period of 24 hr. before removal into the steam curing kilns. An overhead monorail chain hoist handles the heavier pieces and the concrete joists. M. R. Warren, Mr. Warren's son, is in charge of manufacturing at the plant.

One of the earlier plants operated by Mr. Warren at Johnson City., Tenn.



General view of Transit Mix Concrete Co. plant from water front or East River side. Note cement containers on barge to right

# Big Plant in Cramped Space

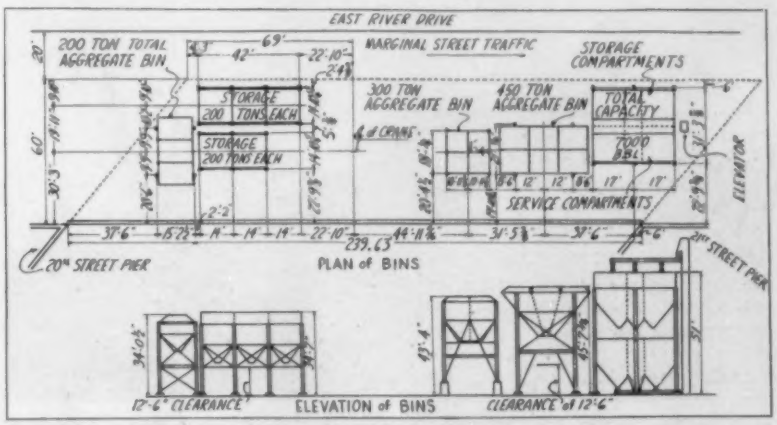
**Transit Mix Concrete Co., New York City, has 6 cu. yd. batching facilities in 60 ft. between waterfront and street**

By NATHAN C. ROCKWOOD

COMPELLED to move its plant from E. 18th St. and East River, New York City, to provide room for the new East River Drive, now under construction, the Transit Mix Concrete Co. selected a site at the foot of E. 21st St. Here one of the country's largest and most complete concrete batching plants has just been completed in a space 239½ ft. long with but 60 ft. between the East River bulkhead and the street line. Obviously this meant utilization of every square foot.

The bin structure is unusual in several respects, the most conspicuous one being that it houses offices for the record keepers, superintendent, inspectors and a laboratory for use of the purchasers' testing engineers. It is more customary to find the offices at ground level; but it is obviously a pleasanter place to work and a better place to see what is going on at the plant to have the offices above ground, as conditions here compelled them to be.

The Transit Mix Concrete Co., of which Joseph H. Dixey (recently elected president of the National Ready Mixed Concrete Association), is vice-president, is associated with the Wm. J. McCormack Sand Co. Referring to the plan, Fig. 1, the plant office of the McCormack Co. (not shown) is in the triangular corner of the property at the extreme left. Next are the bins for aggregates, the 200-ton, three-compartment bin on the left providing for loading ordinary open-top trucks with batched aggregates. It is provided with a




General plan (Fig. 1) of the Transit Mix Concrete Co., New York City, as it would appear from the water-front side


**Left: Scales for aggregates (left) and cement (right) are conveniently located. Push button controls. Right: Type of Diesel-engine driven truck mixer used**

1-cu. yd., three-material Blaw-Knox weighing batcher with beam scale.

To the right of this batcher bin are two rows of compartment bins, three 200-ton compartments in one row, for gravel, and two 200-ton compartments in the other for sand. These bins are equipped with Blaw-Knox double clamshell gates, lever operated, for truck loading.

### Revolving Crane Services All Bins

Between these truck-loading aggregate bins and the concrete batching plant is a Lambert ship crane (revolving) equipped with 3-cu. yd. or 2-cu. yd. Blaw-Knox clamshell bucket. The crane is mounted on a steel superstructure approximately 30 ft. high and is provided with an 85-ft. boom. Power for the hoists is supplied by a pair of 6-cylinder Cummins Diesel engines. This crane unloads the barges of sand and gravel on the water front and can place the materials in any of the bins, including those of the concrete batching plant to be described in what follows.

The 300-ton, 4-compartment bin to the right of the crane (in the plan, Fig. 1) is for batching special jobs where the mix is constant. This year it will be used exclusively for concrete for the Port of New York Authority, which builds the bridges and tunnels. This part of the plant was to have been moved from the old location, but is new because the old equipment was damaged in the attempt to dismantle and move it. The Blaw-Knox batching equipment is of 6 cu. yd. size. No cement storage bin is provided, as cement is brought from the main batching plant, to the right, by automatic screw conveyor.

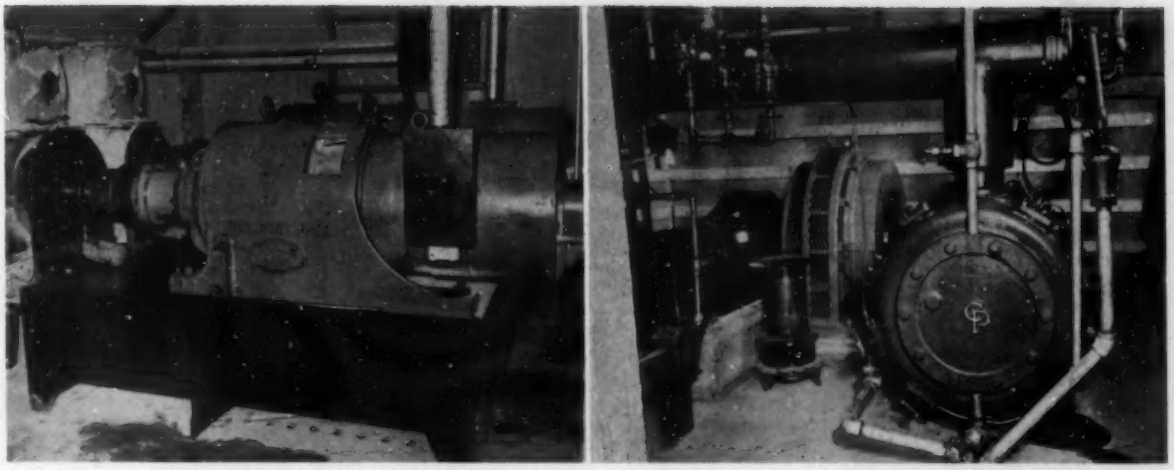
**View of the Transit Mix Concrete Co. plant from East River Drive. Automatic level indicators to prevent overflowing may be seen near the tops of the left hand cement bins to the right of the elevator**

To the right of this smaller batcher bin is a 6-compartment aggregates bin of 450 tons capacity. The Blaw-Knox weighing batching equipment of 6 cu. yd. capacity is practically the same as for the smaller bin already described. The discharge spout is directly under the batcher operator's platform and an opening provides a view of mixer truck loading. Water is proportioned from a Blaw-Knox water weighing tank.

Cement for the mix comes from a six-compartment bin to the right of the aggregate bins. This bin structure and the method of handling the cement are most unusual. It will be noted on the plan, Fig. 1, that the bins are divided into storage compartments and service compartments. The storage compartments are full height with V-bottoms, and hold 2000 bbl., 1000 bbl., and 2000 bbl., respectively. The row of bins marked "service compartments" have their outlets high enough so that they feed directly into a horizontal screw conveyor which discharges into the batcher bins.

### Cement Received in Containers, Sacks or in Bulk

Cement is ordinarily received by barge from waterfront railway terminals in New Jersey. The shipments are made in steel containers holding from 50 to 60 bbl. each, made by the American Car and Foundry Co. They are a patented "air-activated" device leased to the transportation companies. To empty them a compressed air line is attached to one pipe coupling and a cement hose or air-conveyor line to another. By injecting compressed air into the containers the cement is made to flow from the container to any one of



Left: Screw conveyor drives—note rotary bin gates on cement service bins. Right: Air compressor installation for emptying cement containers (shown on page 59)

the plant bin compartments. Two Chicago Pnuematic Tool Co. 12- x 7- x 8-in. O C E compressors supply air at 45 lb. pressure at the containers. It takes 13 to 15 minutes to blow out or pump out a container.

Also cement can be received in bags or bulk and discharged into the Sprout, Waldron bucket elevator on the right-hand end of the cement storage bins. This elevator serves another important function. It takes cement from the bottoms of the storage bins, at ground level, and transfers it to the service bins. A screw conveyor across the bottom outlets of the storage bins feeds the bucket elevator, and a screw conveyor across the tops of bins distributes it to the proper compartment. If a service bin is filled, the cement overflows automatically to a storage compartment. The storage bins are equipped with Bindicators to prevent overflowing. A service bin can be emptied to a storage bin by chuting its contents to the lowest screw conveyor, and hence to the elevator. The arrangement permits handling of six brands or varieties of cement; and of course cement may be transferred from any one of the six bins to any other. The total capacity of the cement storage is 7000 bbl.

The Sprout, Waldron screw conveyors are of the most modern type of drive using Philadelphia Gear Co. Motoreducers-motor and 40/20 gear reducer combined. The motors are Crocker-Wheeler. The screws are mounted on Shafer Bearing Co. dust-proof bearings. One of the accompanying pictures shows the screw conveyor from the service bins to the cement weighing batchers.

The aggregate bins are heated for cold weather by steam pipes; water is heated by live steam turned into the 250-gal. Blaw-Knox pressure tank. The marine type boiler is equipped with a Todd oil burner.

Compressed air is available on the charging floor for cleaning chutes, etc. and may be injected into the cement bins to facilitate flow, when necessary.

### Mixing Requirements Are Rigid

Unlike other cities, a large part of the mixing is done in the truck mixers after arrival at the job. The specifications for the Port Authority and other city public works authorities require this. The aggregates and cement are thus delivered to the mixer drums dry batched and water is carried in a separate tank on the truck where it can be added in measured amounts.

The mixer trucks are all Mack chassis with standard 5-cu. yd. Jaeger mixers—all on four wheels. Forty of these truck mixers, driven by 6-cylinder Cummins Diesel engines, were new last fall. In addition the company has 20 older truck mixers of the same make.

The plant was designed by the company and the Blaw-Knox Co., and was erected under the general supervision of A. D. Gull. It is steel frame covered with cement-asbestos siding. As the accompanying views show, its is an impressive plant seen either from East River or the East River Drive.

Another view of batch control platform, water tank in foreground, screw conveyor from cement service bins on right

## Pipe Plant to Make Blocks

WASHINGTON CONCRETE CO., Washington, Iowa, a well-known manufacturer of concrete culvert and sewer pipe, plans to have a new concrete block unit in operation this spring. Another new venture for this company will be the manufacture of a reinforced concrete wall tile to be used in well lining and well curbing.

## May Build Ready Mix Plant Near San Rafael, Calif.

MCPHAIL FUEL CO., San Rafael, Calif., is planning to build a new ready mixed concrete plant which will be located on a waterway connecting with San Francisco Bay so that raw materials may be received by water. This company may later produce its own sand and gravel and crushed stone. John McPhail is manager of the company.

## Our Mistake

ON PAGE 65 of the March issue of ROCK PRODUCTS, M. W. Ferguson, whose photograph appears in fig. 15 is incorrectly indentified with American Block, Inc., of Roanoke, Va. Mr. Ferguson is president of Cinder Block, Inc., of Roanoke and a director of the National Concrete Masonry Association. Mr. Ferguson's company probably had the best representation at the annual convention, as illustrated by the cut on page 68.

## Trade Commission Order Against Cast Stone Concern

A RECENT BULLETIN of the Federal Trade Commission publishes a Cease and Desist order charging the Southern Art Stone Co., Atlanta, Ga., with "misrepresenting the durability and composition of tombstones and memorials composed of crushed marble, granite, or any similar material; using the term 'free,' or any term of similar import, to designate articles regularly included in a combination offer; representing that respondent's products are from 33½ percent to 50 percent lower in price than competing products, unless and until such is the fact."

## Big Ready Mix Contract

READY MIXED CONCRETE CO., Kansas City, Mo., won the contract totaling $74,833 to supply concrete for the southwest section of the Town Fork sewer.

## Cementstone Expansion

CEMENTSTONE CORP., Pittsburgh, Penn., manufacturer of cast stone products, is planning two one-story additions to its plant on Neville Island, one of which will be 100- x 100-ft., and the other 40- x 140-ft. The cost will be nearly $50,000.

## Gravel Concern Going Into Ready Mix

ROQUEMORE GRAVEL AND SAND CO., Montgomery, Ala., is planning to place in operation a new ready mixed concrete plant a few miles north of this city. The new plant will have a capacity of 300 cu. yd. of ready mixed concrete daily.

## New Ownership

CAPITOL CONCRETE PRODUCTS CO., Topeka, Kan., has taken over the plant of the Kirkham Concrete Products Co. The new owners, Oscar H. Schmidt, Richard L. Schmidt and L. Rosner, will continue the production of concrete blocks and will add Haydite blocks, concrete pipe, septic tanks, burial vaults, concrete joists and ornamental concrete when operations begin. Oscar H. Schmidt is owner of the Schmidt Concrete Products Co., St. Joseph, Mo.

# Masonry Test Data Analyzed

**University of Wisconsin masonry tests and others on water permeability of masonry walls and concrete silos come up before American Concrete Institute for discussion**

INCREASING POPULARITY of concrete products as a construction material was evidenced at the sessions of the American Concrete Institute convention recently held in Chicago.

C. A. HUGHES, associate professor of structural engineering, University of Minnesota Engineering Experiment Station, Minneapolis, Minn., read a technical paper on "Permeability and Acid Test of Silo Staves." Cement used in the manufacture of staves was considered one of the most important factors in the resistance of silo staves to acids.

Another point brought out was that the surface of staves corroded and scaled from the action of acid furnishes some degree of protection to the surface immediately beneath. Corn juice was mentioned as being 50 percent more corrosive to silo staves than other silage juices.

### Permeability and Acid Test of Silo Staves

As to permeability, the 24 hr. absorption test was considered of no value in a determination, but the ratio of the absorption in five minutes to that in 24 hours is recognized as a possible good criterion. Mr. Hughes told about his studies of hydrostatic pressures. Hydrostatic pressures in silos, which often are negative, have a tendency to bring about the maximum effect of the juices on the silo walls, and further knowledge would be helpful in more accurately determining the resistance of silo walls to juices, in his opinion. Following Mr. Hughes' paper, the proposed specifications and methods of testing were discussed. It was brought out in the report covering 49 manufacturers that of 50 silo stave machines 35 were power tamp type, 11 vibration type, 3 hand tamp, and one hydraulic pressure.

PAUL WOODWORTH, Portland Cement Association, in commenting on the paper, discussed the proportionate increase in resistance to the effects of acid with increases in transverse strength and the adverse effect of improper grading of aggregates.

### Concrete Masonry Tests

KURT F. WENDT, assistant professor of mechanics, University of Wisconsin, read a complete report on "Tests on Concrete Masonry Units Using Tamping and Vibration Molding Methods." The text of the paper, which was prepared in collaboration with Paul Woodworth, Portland Cement Association, was summarized in ROCK PRODUCTS, March, 1940, pp. 69-70, from a paper presented at the recent N. C. M. A. convention by Mr. Woodworth.

In discussing the paper, H. C. SHIELDS emphasized the importance of the cement factor in the durability of concrete masonry units, and also the quality of the cement paste.

He suggested that consideration be given to specifications for two classifications of concrete masonry units. The first would require a minimum compressive strength of 1000 p.s.i. over gross area at 28 days and a rate of absorption not to exceed 0.87 for load bearing units as recommended by the authors in their paper. It was Mr. Shield's suggestion that this specification hold for those units in service which would be exposed to the elements.

The second classification would require a minimum compressive strength of 700 p.s.i. at 28 days with an absorption limit of 15 or 16 lb. per cu. ft. for units which would not be exposed to the elements, such as units used in backup, for floor tile, fireproofing, partitions, etc. Mr. Shields' point was that units so used should not be penalized by requirements that are more severe than necessary.

### Grading of Aggregates

BENJAMIN WILK, Detroit, Mich., pointed to the number of good jobs in his territory that are giving excellent service and which were built with concrete units testing 700 p.s.i. In his opinion, 700 p.s.i. compressive strength at the time of delivery of the units is satisfactory, but he was not in favor of 1000 p.s.i. at time of delivery. This figure, in his opinion, would penalize manufacturers who often deliver units less than 28 days old. Setting a standard of 1000 p.s.i. would be satisfactory, he said, if it applied to units 28 days old.

In discussing the tests generally, Mr. Wilk confined his comments to sand and gravel blocks. He pointed to the cases given where strengths of 1000 p.s.i. were arrived at with yields of 33 units per sack of cement as unusual and as the product of plant operating efficiency that very few manufacturers could attain. This kind of performance would require the ultimate in knowledge of concrete making, expert supervision, accurate control of curing conditions, etc., in his opinion.

As to grading of aggregates, he suggested that the grading which is most satisfactory for the manufacture of tamped units might not be the best one for units made by vibration. For example, having 23 percent of the aggregate greater than ¼ in. in size is likely a good condition for tamped units, but the figure could be increased for vibrated units.

Another point brought out was that in the case of vibrated units the weight of the units was five percent greater than those made by tamping, using a concrete that was only two percent heavier, the reason being a thicker web. He suggested that increasing the core sizes of the vibrated units was a possibility in order to arrive at comparable weights. Mr. Wilk questioned why more mixing water had been used in manufacturing the higher yield vibrated units than in the case of those that were tamped. He concluded his discussion by saying that inasmuch as results were not uniform for all the aggregates, manufacturers having both vibrating and tamping machines should give some thought to a study of results obtained in their own plants.

M. O. WITHEY followed Mr. Wilk with a technical presentation of durability tests that have been made at the University of Wisconsin over a period of years. D. E. PARSONS, National Bureau of Standards, Washington, D. C., said that variations in the grading of aggregates likely had their influence on the inconsistency of results obtained and suggested that the study be continued. He is of the opinion that information on volume change should be developed that will help the purchaser of concrete units to determine what volume change he will get when purchasing units.

The concluding paper, "Tests of the Resistance to Rain Penetration of

## "I've got more business than I can handle," *says* CHRIS HAMPEN, after 4 years' experience building CONCRETE HOMES

*Architect: Nelson Smith, Birmingham*

Builder Chris Hampen, of Birmingham, Ala., quoted above, also says:

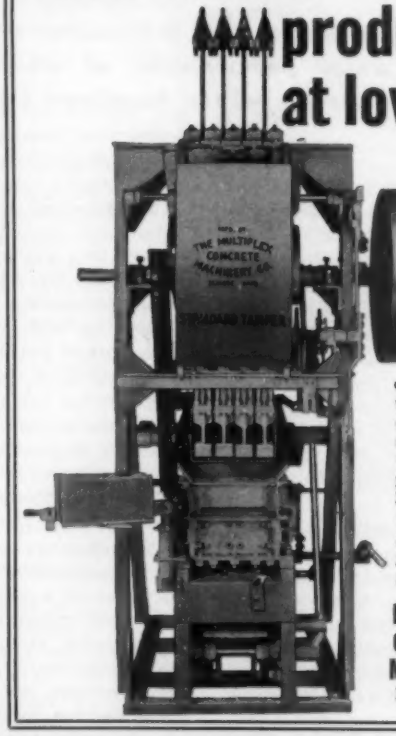
**"The architects who design my homes see eye to eye with me on the importance of achieving sound construction. That's why we are using walls and floors of firesafe, termite-proof concrete. Never have home-owners in Birmingham received so much for their money."**

Mr. Hampen is one of a growing legion of builders who have cooperated with concrete products manufacturers, concrete contractors and ready-mix firms to turn new public interest in concrete homes into new profits.

This Association is continuing its national advertising campaign on concrete homes. The prospect in 1940 is for a record number of concrete demonstration homes, supported by advertising campaigns to put concrete homes over locally. Residential volume should continue to grow for concrete products firms and concrete builders who work with live builders on such demonstration projects. Literature on request.

**PORTLAND CEMENT ASSOCIATION**
**Dept. 4-45, 33 W. Grand Ave., Chicago, Illinois**
*A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work*

## MULTIPLEX for high production at low cost



The Standard Tamper is a high production machine, operating at a low cost of maintenance. It produces a true and uniform block, and has automatic feeding and time-controlled tamping. The machine makes all sizes of units whether brick, plain, or face blocks.

*Write for full particulars on this high production, low cost unit.*

**MULTIPLEX CONCRETE MACHINERY CO.**
ELMORE, OHIO

## COMMERCIAL PRESTEEL


**The Steel Pallet that is formed cold, under pressure increasing its strength**

*. . . More Durable*
*More Economical*

**Produces better blocks with sharp edges and mortar grooves**

**A light weight pallet which fits closer to the core box**

**Less storage space required**

**Lowest investment and maintenance cost**

***For further particulars write***

**The Commercial Shearing & Stamping Co.**
**YOUNGSTOWN, OHIO**

Walls Built of Masonry and Concrete," by R. E. COPELAND and C. C. CARLSON, both of the Development Department, Portland Cement Association, was read by Mr. Copeland.

Factors studied included the type and grading of aggregates, concrete mixing and curing conditions, wall thickness, mortar composition, joint treatment, surface texture, kind and application of different surface waterproofings, the effect of weather exposure on paint coatings and workmanship in laying the walls. Brick walls as well as those of concrete building block were considered.

Concrete masonry walls covered with portland cement paint applied with a stiff bristle brush to form a continuous film free of voids and crazing were classified as excellent. By excellent is meant that after subjection to wind-driven rain for 24 hr., in quantities and at velocities calculated to more than cover practically all conditions experienced in nature, there were no fluid leaks and no dampness on the back face. Concrete masonry with three coats of portland cement stucco and 12-in. face brick walls, with either solid brick or concrete masonry backup built with good workmanship, were also rated as excellent.

Classified as good, meaning no leakage and less than 25 percent of the back face dampened in 24 hr. of testing, was the painted concrete masonry wall where the paint coatings had developed superficial crazing due to normal shrinkage effects.

A fair rating, not more than 15 lb. of fluid leakage and dampening not to exceed 50 percent of the back face in 24 hr. of testing, was given to 8-in. walls of 2-in. face brick and 6-in. concrete masonry backup built with through header courses (no header block). The same rating was given to spray painted concrete masonry walls, the coatings of which contained minute pinholes.

Classified as poor, 15 to 50 lb. fluid leakage and/or a dampening of 50 to 75 percent of the back face in 24 hr., were the painted cinder block walls, the paint coatings of which were badly crazed due to excessive expansion of the cinder concrete. Very poor rating, fluid leakage of more than 50 lb. and general dampening of the back face, was given to unpainted concrete masonry walls or those treated with thin-bodied liquid waterproofings of the penetrative type. Also rated as very poor were 8-in. walls of 4-in. face brick and 4-in. cinder tile backup built with average workmanship, and 8-in. walls of 2-in. face brick and 6-in. concrete masonry backup built with header block at header courses and with no provisions to retard the downward drainage of moisture in the core spaces.

### Conclusions

A number of more general conclusions were drawn from the tests. Unpainted masonry walls leaked rapidly regardless of the type and grading of aggregates, the concrete mix or the surface texture. Much of the leakage occurred at the mortar joints. Oscillated face units were slightly less permeable.

All concrete masonry walls given two coats of brush applied portland cement paint were practically impervious as long as the paint remained in good condition, and paint proved slightly more effective when applied to relatively smooth, dense surfaces. One coating of paint greatly improved the performance of concrete masonry but was not as effective as two coats.

Sprayed coatings of cement paint, because of the development of small pinholes, were less effective than those brush applied. A 4-in. painted concrete wall performed satisfactorily but less so than a similar 8-in. wall. Stuccoed concrete masonry walls showed no penetration through either the exposed face or back face after 219 hours of test exposure.

Painting over the joints slightly reduced the leakage through plain concrete block masonry, and plain concrete masonry walls built of high pressure steam cured block leaked appreciably less than the other plain walls.

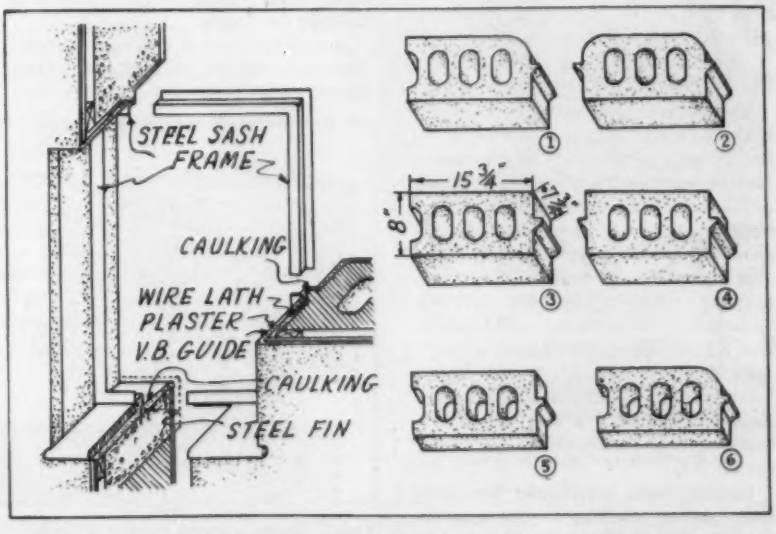
Normal crazing due to shrinkage and weathering effects over a 32 months' period did not seriously impair the imperviousness of portland cement paints. The quality of the cinders used in cinder block was found of importance in controlling excessive crazing and the addition of calcium stearate to the mortars was of benefit.

As to mortars, the quality of the lime used influenced the workability and performance. Best results were had with the use of a quicklime putty. In general, walls that showed relatively impervious qualities in the standard test were also highly resistant in the test employing a 56 m.p.h. wind. The complete report of these tests appeared in the November, 1939, *Journal* of the Institute.

# Sash Block Simplify Construction

TYPICAL of new shapes into which concrete is molded are the sash block shown in the illustration.

These units were devised to simplify erecting a building and are made and sold exclusively in Dade and Broward counties, Florida, by the Diamond Block Co., Miami. Unit shapes shown are: (1) 8-in. steel sash block, single end round corner; (2) 8-in. steel sash block, double end round corner; (3) 8-in. steel sash block, single end; (4) 8-in. steel sash block, double end; (5) 4-in. steel sash block, single end; (6) 4-in. steel sash block, single end round corner.




Different types of concrete masonry sash block which simplify construction

# LID TO COME OFF?

## Going to find out why ready-mixed concrete is not used in Chicago

AT LAST it appears that the public will learn the reasons why, of all the large and small cities of the United States, Chicago, Ill., has no ready-mixed concrete industry. Most of those in the business in other cities and the manufacturers of mixer equipment have had a pretty good idea for a long time. Now it seems the federal Department of Justice is to start an investigation.

Announcement was made in Chicago, March 11, that Special Assistant Attorney General Leo F. Tierney, seeking to find out why ready-mixed concrete is not used in this area in paving and other concrete construction, obtained from Federal Judge Charles E. Woodward subpoenas duces tecum that called on 20 concerns to produce an elaborate series of documents, letters and telegrams concerning the question.

According to the *Chicago Daily News* the government is particularly interested, according to its petition, in having correspondence between the firms named and Michael Carrozzo, head of the International Hod Carriers, Building and Construction Laborers of America, who started his career as a street sweeper and has attained ownership of a 900-acre estate near Hobart, Ind., where he has gone in for breeding horses.

In 1938, it was recalled, Carrozzo called a strike on a construction project in which an attempt was made to use the ready-mixed system. Carrozzo at the time said he called the strike against the system because it would reduce the number of men used on such jobs.

The government petition, 14 pages long, is specific in its demands on the various companies for communications with and documents relating to "demands, threats of strikes and strikes" by Local 150 of the International Union of Operating Engineers and Operators, of which William E. Malloney is head; the Hod Carriers, Teamsters, Chauffeurs, Stablemen and Helpers executive council of Chicago, the Joint Council No. 25 of the International Brotherhood of Teamsters and Locals 731 and 786 of the International Brotherhood of Teamsters.

It also asks specifically for correspondence relating to the restrictions on use of ready-mixed concrete in the Chicago area and restrictions on its production, sale and delivery.

Communications between the companies subpoenaed and Chicago companies engaged in concrete construction work or sales or production of ingredients of concrete as well as with a number of associations are also demanded. Communications sought go back as far as 1928.

Local producer companies named in this section of the petition are Construction Aggregates Corp., Consumers Co., and Material Service Corp.

The associations are Illinois Road Builders Association, Metropolitan Constructors Association, Paving Contractors of Cook County and Paving Contractors Association of Chicago, Illinois Society of Architects, American Institute of Architects, Employers' Association of Chicago, the Associated General Contractors of America and Affiliates, Washington; the Associated Equipment Distributors, Cincinnati; the American Federation of Labor, the Illinois Federation of Labor, the Chicago Federation of Labor, the Congress of Industrial Organizations, the Chicago and Cook County Building and Construction Trades Council.

The petitions defined the Chicago area that is affected by the situation in the ready-mixed concrete business as the city proper and Cook, Lake, McHenry, De Kalb, Kane, Du Page, Will, Kankakee, Kendall and Grundy counties.

According to the *Chicago Herald-American* the twenty equipment firms which were directed to produce their records before the federal grand jury on March 27 are:

T. L. Smith Co., Milwaukee; Butler Bin Co., Waukesha, Wis.; Chain Belt Co., Milwaukee; Jaeger Machine Co., Columbus, O.; Koehring Manufacturing Co., Milwaukee; Ransome Concrete Machinery Co., Dunellen, N. J.; Leach Concrete Mixer Sales & Service Co., Oshkosh, Wis.; Blaw-Knox Co., Pittsburgh; The Knickerbocker Co., Jackson, Mich.; Gilson Brothers' Co., Fredonia, Wis.; Bodinson Manufacturing Co., San Francisco; Erie Steel Construction Co., Erie Penn.; Heltzel Steel Form & Iron Co., Warren, O.; C. S. Johnson Co., Champaign, Ill.; Neff & Fry Co., Camden, O.; R. L. Concrete Machinery Co., Kendalville, Ind.; Concrete Transport Mixer Co., St. Louis, Mo.; B. M. Cropp & Co., Chicago; Thomas W. Noble Co., Chicago, and the Anchor Manufacturing Co., Chicago.

None of the above machinery firms, it was explained, is the target of the government's inquiry. Subpoenas for records of these firms were obtained, rather, in the hope that they would contain evidence on which indictments of those found to be responsible for the alleged monopoly could be based.

### Permanent Roadway Lines

E. M. DEZENDORF, of the Dezendorf Marble Co., Austin, Texas, terrazo aggregate producer, has patented a permanent traffic marker, details of which are shown herewith. This patent is for a form to hold colored aggregate in roadway traffic lines.

By the use of colored aggregates, white cement, and color pigments, traffic lines can be made in any desired color; red on curves to indicate danger; white on the straightways; red and white, or red and black on approaching grades. By means of spacers the marker form may provide for any desired width of line.

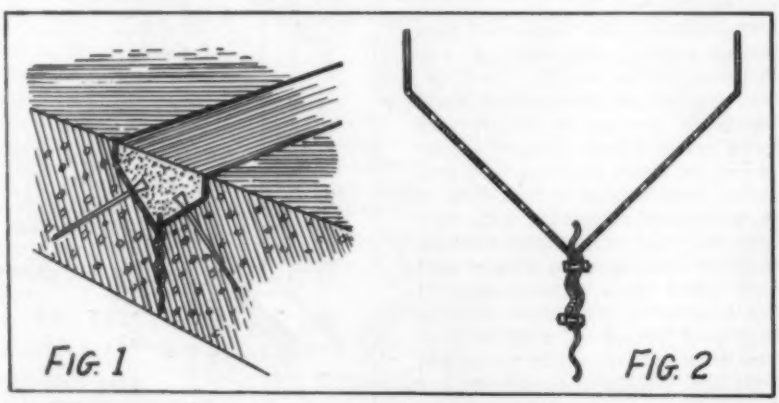



**Fig. 1: Marker trough anchored in the concrete roadway sinb. Fig. 2: Cross section of the metal trough or form**

# Pipe Men Discuss Legislation, Standards and Operating Details

OVER 100 DELEGATES attended the annual convention of the American Concrete Pipe Association convention at the Palmer House in Chicago, February 15 to 17, inclusive. In the absence of President Chutter who was unable to attend, R. S. Lander acted as chairman.

New officers elected were as follows: president, H. D. Palmore, president, Kentucky Concrete Pipe Co., Frankfort, Ky.; vice-presidents, J. D. Porter, secretary, Gifford-Hill Pipe Co., Dallas, Texas; L. D. Bailey, president, The Cretex Companies, Inc., Elk River, Minn.; J. E. Miller, president, Lewistown Pipe Co., Fort Wayne, Ind.; J. D. Mollendorf, Illinois-Wisconsin Concrete Pipe and Tile Co., Chicago, Ill. M. W. Loving continues as secretary-treasurer.

"Planning Public Improvements" was the title of an address by Robert Kingery, manager, Chicago Regional Planning Association, who told about the long-range planning program carried on by his organization over a 50-mile belt surrounding Chicago, and extending into Wisconsin and Indiana. He pointed out that if a program is plotted out in advance based upon anticipated population growth a great deal more may be accomplished and for less money. He illustrated his talk with slides showing how the Planning Association had carried forward its program of improvements to water supply, sewage treatment, and highways and urged the members to work for a similar program in their communities.

"Prestressed Reinforced Concrete Pipe" was discussed by Prof. R. B. Crepps, Purdue University. He told about the tests and research work at Purdue. He briefly sketched the early studies in pre-stressing concrete reinforcement steel to prevent the cracks in the concrete set up by internal stresses in curing which permit chemical action on the concrete itself and corrosion of the steel. His studies indicated that reinforcing steel should be pre-stressed up to 75 percent of the tensile strength of the steel to secure the maximum benefits. He mentioned the Lewistown Pipe Co. tests, using bridge cable for pipe reinforcement steel, and referred to the Hammond, Ind., tests on 24-in. and 30-in. pipe. This paper was followed by a sound motion picture of the manufacture of large concrete pipe by the Lock Joint Pipe Co., Ampere, N. J., which had been previously described in ROCK PRODUCTS (September, 1939, p. 59).

### Changes in Standard A.S.T.M. Specifications

On the second day of the convention, after a night of festivities at the banquet, there was a lively discussion on the proposed changes in standard specifications for concrete pipe. It was voted to recommend that the strength specifications in A.S.T.M. C-14-35, be increased to federal specifications S.S.-B-371. A proposal to take out the percolation or hydrostatic test was voted down. It was voted to insert a paragraph that all machine made pipe (packer head and tamped) should have web-like markings on the exterior surface. A favorable vote was taken on an amendment to section 29-b, C-76-37, that the circumferential steel reinforcing shall have a covering of a minimum of ¾-in. It also was voted that under section 34-e, the word "circumferential" should be inserted before "reinforcement."

At the afternoon session, there was a discussion of the pending federal legislation regarding the manufacture of concrete pipe by the W.P.A. The practice of renting old pipe manufacturing equipment to fly-by-night contractors was also discussed.

A considerable discussion developed about the proposal to issue a manual. It was finally decided that a series of pamphlets would be issued with the objective of eventually incorporating them into a bound manual for distribution.

### To Manufacture Pipe

PLATTSBURGH STONE PRODUCTS CORP., Plattsburgh, N. Y., will soon start the manufacture of reinforced concrete pipe at its quarry on Beekmantown road. Equipment is being installed to make 8- to 54-in. diameter pipe. Several months ago the company started producing ready-mixed concrete.

### Cement Colors

## Exhibits Feature of Burial Vault Program

TWO INNOVATIONS will be introduced at the annual convention of the National Concrete Burial Vault Association, Netherland Plaza Hotel, Cincinnati, Ohio, May 7, 8, and 9. There will be an exhibit with ample time in the program for inspections by the members, and lectures will be given on practical vault manufacturing. Lowell K. Huber is general chairman of the convention city committee, and J. R. Van Meter, also of Cincinnati, is chairman of the program and exhibits.

According to Secretary R. W. Mead, numerous letters received in his office and by the president and members of the convention committees indicate that this convention will probably top all others for attendance. There will be a three-day session instead of the usual crowded two-day meeting.

Entertainment for the ladies always has been a feature. On the first day of the convention there will be a sightseeing trip with lunch served at one of the outlying inns. The return trip will be made by way of Eden Park Conservatory and the Rockwood Pottery. For Wednesday, a card party and tea is scheduled.

For the delegates, a feature of the convention which proved popular in Detroit will be the round table discussions held at the luncheons on Tuesday and Wednesday. Visits will be made to two concrete vault factories where practical demonstrations will be made. Paul Woodworth of the Portland Cement Association will be in charge of these demonstrations.

Other speakers on the program will be Harry J. Giligan, secretary of the National Funeral Directors' Association, C. R. Runyan, cemetery superintendent, and P. N. Rothe, general manager of the publication, *Casket and Sunnyside*. The banquet is on the evening of the second day, Wednesday, May 8.

## Start Production of Concrete Burial Vaults

C. E. CARPENTER & Co., Fort Miller, N. J., has started the manufacture of concrete burial vaults at its new plant. Stockholders in the company are Carroll E. Carpenter, Akron, Ohio; and Paul Tomilson and Jefferson D. Davis of Fort Miller. Mr. Davis has had practical experience in the manufacture of concrete burial vaults, having been connected with the Norwalk Manufacturing Co. plant at Hudson Falls, N. Y.

# NEWS ABOUT PEOPLE

M. H. Basquin has been elected vice-president in charge of operations of the United States Gypsum Corp. H. L. Pearson, treasurer of Montgomery Ward & Co., has been elected a director of the company, succeeding E. L. Ryerson, Jr., who resigned. Mr. Basquin started with the company in 1922, doing laboratory work. He later served as operating plant manager in several plants and as production manager for all plants. Since 1936 he has been general manager of operations.

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R. W. Patterson has been elected secretary of the Kirkpatrick Sand & Cement Co., Birmingham, Ala., to succeed A. Mahon, who resigned. The Kirkpatrick role of officers can truly boast of a long term record. R. N. Hawkins, president, has a record of 33 years; L. C. Mayo, treasurer, has been with the company 27 years; and R. W. Patterson, secretary, for 25 years.

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Ernest E. Eddy, last year assistant manager of the Sullivan Machinery Co., is now manager of the Spokane Loc Bloc Co., Spokane, Wash.

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Curtis B. Dall of New York City has been elected president of the new Maury - Williamson Phosphate Co., Inc., Nashville, Tenn.

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B. C. Burgess is manager of the newly formed Minpro division of the United Feldspar Corp., Spruce Pine, N. C. This division was formerly the Tennessee Mineral Products Corp., and Mr. Burgess assisted in organizing it in 1921. He is also secretary and manager of the Carolina Pyrophyllite Co., Staley, N. C.

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Dr. Frederick Gardner Cottrell, inventor and developer of the Cottrell process of electrical precipitation, was among those honored by the National Association of Manufacturers as being one of this country's "Modern Pioneers." Wallace L. Caldwell, president of the Alabama Asphaltic Limestone Co., Birmingham, also was honored. He has been awarded various patents widely used in the manufacture of precast building units.

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## Sand and Gravel

At the meeting of the Manufacturers Division, National Sand and Gravel Association held at the time of the recent annual convention, it was decided to elect a new chairman

Bruce G. Shotton

every year in order that the honorary office may be given wider distribution. Chairmen will not be eligible for re-election. The present official personnel of the Division is as follows: Chairman, Bruce G. Shotton, Hendrick Manufacturing Co., Pittsburgh, Penn.; vice-chairmen, Theo. Aulmann, Eagle Iron Works, Des Moines, Iowa; Irwin F. Deister, Deister Machine Co., Fort Wayne, Ind.; F. E. Finch, Hardinge Co., York, Penn.; A. A. Levison, Blaw-Knox Co., Pittsburgh, Penn.; L. W. Shugg, General Electric Co., Schenectady, N. Y., and Frank B. Ungar, The Ludlow-Saylor Wire Co., St. Louis, Mo.

Elwood T. Nettleton has resigned his position as secretary and engineering director of the New York State Crushed Stone Association to become the general superintendent of the following four companies: L. Suzio Construction Co., L. Suzio Trap Rock Co., The Suzio Trap Rock Co., and the York Hill Trap Rock Quarry Co., with headquarters at Meriden, Conn.

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W. W. Fischer, president of the Batesville White Lime Co., Batesville, Ark., has been elected chairman of the board; Louis R. Myers, was elected president; and Lee McCourt was named vice-president. Mr. Fischer is also president of the Fischer Lime & Cement Co., Memphis, Tenn.

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W. A. Bliss, general manager of the Dravo Corp., Keystone Sand Division, has been elected president of the Pennsylvania Sand and Gravel Producers' Association for 1940, and Alexander Foster, Jr., vice-president of the Warner Co., has been elected vice-president.

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Wm. H. McConochie, for 37 years treasurer of the Rock Island Sand and Gravel Co., Rock Island, Ill., has been named president to succeed the late Charles J. Larkin. Other officers are Robert F. McConochie, vice-president, Leo A. Larkin, treasurer, and Harry J. Larkin, secretary and general manager. Two new directors also were elected: John Hollingsworth and Willard F. Larkin.

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James R. Addington has succeeded the late Michael Luery as president of the American Rock Wool Corp., Wabash, Ind.

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Benjamin F. Affleck, retired president of the Universal Atlas Cement Co., finds no idle time, if one may judge by the frequent references to his civic activities in the Chicago newspapers. Mr. Affleck not only has decided convictions about political science, but unlike many others, he "does something about it." Latest is a project to bring to Chicago from the East, the Junior Achievement. Some 40,000 young people in the East are already in this movement. Mr. Affleck is one of a committee of prominent Chicago business men to help start it here. The object is to give young people a practical education in the American system of free enterprise.

The plan is to help young people, rich and poor alike, by showing them how to help themselves. The procedure calls for groups of 15 boys or girls, between the ages of 16 and 21, to form

corporations. Each group will decide what product to manufacture. The members will sell stock and, with the working capital thus obtained, will rent a shop and buy necessary tools. They then will make the product and market it themselves.

These corporations make everything from baby incubators to fine leather goods. If the product doesn't sell, then it's up to the boys or girls to find a product that does.

Junior Achievement provides manuals which instruct the various officers of the corporation in their respective duties. All the members are stockholders and are, by turn, boss, and employe. Each corporation has three expert advisers, volunteers who are usually young business executives. Otherwise the youthful corporation members are entirely on their own.

The shares of stock usually have a par value of 50 to 75 cents and the total capitalization is $50 to $75. The average annual return on each share of stock in the corporations already operating has been 7 to 10 percent.

Junior Achievement was founded 20 years ago by Horace Moses, president of a paper company in West Springfield, Mass. Almost all boys and girls who have been graduated from Junior Achievement have jobs.

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GEORGE S. WHYTE, founder of the Macwhyte Co., Kenosha, Wis., and familiarly known to his many business friends as Sandy Macwhyte, and his "guid" wife celebrated their golden wedding anniversary by inviting all company employes and their wives to a strictly informal dinner. More than 650 attended.

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DR. GERALD PICKETT, associate professor of applied mechanics at Kansas State College, has resigned to accept a position in the research department of the Portland Cement Association.

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FREDERIC PICKFORD, secretary of the Medusa Portland Cement Co., was elected a director at the annual stockholders' meeting. Dan P. Eells has been elected to the executive committee to fill the vacancy caused by the death of Clay Hollister. Mr. Eells is also vice-president of Bucyrus-Erie Co.

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C. H. CARMICHAEL, formerly manager of the Atlantic Brick Co., Watertown, Mass., sand-lime brick producer, is now with the Gray's Ferry Brick Co., Philadelphia.

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MRS. M. E. BULLEN, widow of the late Fred H. Bullen, is now president of the Fountain Sand & Gravel Co., Pueblo, Colo. Mrs. E. C. Bullen is vice-president and J. A. Bullen retains the office of secretary and manager. Ralph Donaghy has been appointed assistant manager.

## Plant Personality

WONDER WHY we put some pictures of plant offices on this page? Well, we started it in the April, 1939, issue, pointing out that offices do illustrate personalities. Every great work of art, as some one once said, is merely the lengthened shadow of a great person.

The views herewith are of the office building and landscaping of the Clinchfield, Ga., plant of the Pennsylvania-Dixie Cement Corp. To "Bill" Klein, vice-president of the company and its operating chief, we extend our heartiest congratulations.

Until we received these photos we thought the West Coast had a near monopoly on this sort of plant office. E. P. Newhard is the superintendent at this plant—and he used to be a chemist.

*(Obituaries appear on page 96)*

Above, office building and below, a view of landscaping at Pennsylvania-Dixie Cement Corp. plant, Clinchfield, Ga.

## Large Ballast Plant

UTAH SAND AND GRAVEL PRODUCTS Co., Salt Lake City, Utah, will build a $125,000 sand and gravel plant near Evanston, Wyo., to furnish ballast for the Union Pacific Railroad. Nine million cubic yards of gravel will be made available for ballast to be used on roadbeds between Cheyenne and Ogden, Utah.

## To Add Third Kiln to Permanente

THE PERMANENTE CORP., near LOS Altos, Calif., is to install a third kiln to bring capacity to approximately 9000 bbl. per day, according to recent reports. A single kiln of the new plant is said to have produced 3400 bbl. of clinker per 24 hr. In addition to the $6,000,000 order for cement from the federal government for the Shasta Dam project, the company is filling a 500,000 bbl. order for the Navy, and has received an order for 500,000 bbl. from the Ready-Mix Concrete Co., Ltd., Honolulu, Hawaii.

## Centennial Observed by Gypsum Company

NEWARK PLASTER Co., Newark, N. J., recently celebrated its centennial anniversary. Although 1818 saw the beginnings of this company, it was in 1840 that a charter was granted by the legislature to the corporation which was then known as The Newark Lime & Cement Manufacturing Co.

Since the beginning of the present century, the principal activity of the company has been the manufacture of gypsum products and its name was changed to Newark Plaster Co. Since 1918 its management has been continuously in the hands of direct descendants of the founder, Calvin Tomkins.

## Rock Products Census

BUREAU OF CENSUS representatives will soon call upon producers in the rock products industries for information about their business, the compilation of which will provide some valuable statistics. It is urged that complete coöperation be given in filling out the forms. The Census of Mines and Quarries will record data on production, operating methods and equipment, employment, manhours and shipments. A complete inventory, for example, will be taken on all mechanical loading devices; such as power shovels, draglines, clamshells, and scraper loaders, and the source of power.

In the Census of Business will be recorded the sales of sand, gravel, crushed stone, slate, concrete products, cement, lime, plaster, and stucco. The amount of limestone used by the steel industry will be recorded, and the amount of limestone and lime, sandstone products used by the glass industry. The Housing Census will be helpful in pointing out enlarged markets for materials, and the Census of Drainage and Irrigation will record the number of miles of pipe lines, classified by materials, such as concrete, metal or wood.


## Stanton Walker Fellowship

AT THE ANNUAL MEETING of the board of directors of the National Sand and Gravel Association a resolution was favorably voted upon to establish a graduate fellowship at the University of Maryland for the purpose of conducting researches on problems related to the sand and gravel industry. A sum of $1800 was voted for the fellowship which will be established for two years. The fellowship was designated "The Stanton Walker Fellowship" as a mark of appreciation of the association for Mr. Walker's work as Director of Engineering. The University Board of Regents recently accepted the fellowship.

## Super Highway Requires Large Cement Deliveries

CONSTRUCTION of the new superhighway between Harrisburg and Pittsburgh, now well under way, will require a large quantity of cement for the 100 miles of concrete road way, tunnels, etc. At the peak of the work it is expected that 60,000 bbl. of cement may be used daily. Approximately 3,000,000 bbl. will be needed before July 1. While the Lehigh valley mills will furnish a large part of the cement, other orders will go to mills in the vicinity of Pittsburgh and York, Penn., and Hagerstown, Md.

## Monolith to Expand

MONOLITH PORTLAND CEMENT Co., Los Angeles, Calif., will build an additional kiln and equipment to increase annual production about 1,000,000 bbl., according to Coy Burnett, president. Mr. Burnett reported at the annual meeting that sales prospects for 1940 are better than they were in 1939 but that prices may go lower.

## Install New Rotary Kiln At Lime Plant

TEST RUNS have been completed on a new 6- x 110-ft. rotary lime kiln at the plant of the St. Clair Lime and Material Co., near Guion, Ark. It is fired with crude oil, and is said to be the first of its kind installed in this area. The capacity is 75 tons in 24 hr. The company, which is headed by Edger Baker, owns 376 acres bordering on the White River division of the Missouri Pacific railroad.

## Improvements Make Possible Cleaner Product

DURING THE PAST two years The More Sand Co., Junction City, Kans., has spent $16,000 for equipment, including a Diesel engine to operate the sand pump, and a small crane. The most recent addition is an Eagle Iron Works sand and gravel washer. Iowa specifications permit a maximum of 2 percent of silt in concrete sand and "cover material," and 3 percent in road gravel. Some trouble had been experienced in keeping the silt content down after high water each spring, but present equipment, according to Mr. More, has solved the problem.

## Eastern Lime Rates to be Altered

AFTER NEARLY 3 YEARS of mulling thereover by the railroads, the I. C. C. has modified its prior findings in No. 19957, Northwestern Ohio Lime Manufacturers, et al. vs. Pennsylvania, et al., so as to permit revision of rates on lime from origins in central territory and Mosher and Ste. Genevieve, Mo., to destinations in trunk line and New England territories. A petition filed by the carriers March 2, 1939, by the defendants in the title case is the foundation on which will rest the revision that is to be made. The Commission said it was not its purpose on this reconsideration to reconsider the question of the reasonableness of the general level of rates prescribed in the prior reports, but only the lawfulness of particular rates which would be altered under the proposals in the petition to change destination grouping.

## Cement Plant Expansion

COLUMBIA CEMENT DIVISION, Pittsburgh Plate Glass Co., Pittsburgh, Penn., has completed the first unit of a $102,000 expansion program at East Fultonham, Ohio, comprising ten concrete silos which will increase storage capacity by 75,000 bbl. McDonald Engineering Co., Chicago, had the contract for the project. Second unit in the program will include the installation of new conveyors, elevators, hoppers, bins and packing machines. The program was made necessary to meet increasing demands for various types of cements.

## Explosives Used By Rock Products Industry

BUREAU OF MINES recently issued a statistical report on explosives manufactured and sold for domestic consumption which indicates the important market offered by the rock products industry. In 1939, the industry purchased 80,398 kegs of granular black powder, 15,694 cases of pellet black powder, 53,732,399 lb. of high explosives, and 387,250 lb. of permissible explosives. These figures indicate that the non-metallic mining and quarrying industry is the third largest user of explosives.

## New Pipe Lining Cement

J. C. WITT, well known in cement manufacturing circles in the Middle West, has received U. S. Patent No. 2,182,714 for a new pipe lining cement.

The specification states: "Pipe lining cements have heretofore been made by compounding materials readily obtainable and having established well known uses. The present invention aims to produce an improved cement for like purposes by mixing blast furnace slag with a special portland cement clinker having certain desired characteristics. More particularly, the present cement is produced by compounding blast furnace slag and special portland cement clinker in proper proportions with sufficient gypsum for controlling the set of the final product. The slag, special cement clinker and gypsum are then ground together to approximately 200-mesh fineness. The special clinker was chosen from approximately 90 experimental burns primarily on the basis of its low solubility in water."

The new cement is said to be highly resistant to water and to the substances that may be present in natural waters, such as sulphates. While it was developed for the lining of pipes and tanks, it seems likely that many additional uses for it will be found.

## Developments in Sand and Gravel

J. W. HARTMAN CO. is constructing a modern sand and gravel plant on the Trinity river near Malakoff, Texas. Hubert Ferguson has been retained to supervise the work and to make tests of pit locations. The new plant will produce concrete sand and gravel, plaster sand, masonry sand, roofing gravel, and asphalt cover aggregate for highway construction.

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FRANK S. SWOPE has completed a sand and gravel washing plant at Booths Corners near Lynden, Wash.

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CONTRA COSTA County Supervisors have given notice of intention to purchase the E. P. Jackson gravel pit near Concord, Calif.

## Patented Grinding Aid

A PATENT covering the use of carbon black as a cement clinker grinding aid has been awarded to George C. Wilsnack, Easton, Penn. The addition of about .08 percent carbon black to the clinker is said to facilitate grinding considerably and to improve the cement. The patent is assigned to the Edison Cement Corp. and the Binney and Smith Co., New York, N. Y.

## Liberalize Federal Agstone Specifications

SPECIFICATIONS for fineness of ground agricultural limestone in connection with the soil building practice regulations of the AAA have been revised at the request of the Arkansas Farm Bureau Federation to permit farmers in the northwestern part of the state to participate in the program. The 1939 regulations required that between 20 and 30 percent of the ground limestone must pass a sieve of 100-mesh. However, the 1940 regulation called for 50 percent to pass 100-mesh. This has been changed to permit 25 percent to pass 100-mesh for the mountain areas of northwestern Arkansas.

## Canadian Lime Production

PRODUCTION OF LIME in December, 1939, amounted to 54,780 tons; in November 59,637 tons were produced, while in December, 1938, output was 38,044 tons, according to Dominion Bureau of Statistics reports. Production in Canada during 1939 aggregated 539,904 tons, against 486,922 tons in 1938. Importations during 1939 aggregated 6058 tons valued at $33,342. Exports for the same period were negligible.

# FREE ! New Literature

**THE bulletins and catalogs described below are for your benefit. To save you the necessity of writing individual letters, those you want can be obtained by merely checking and mailing the post card on this page.**

**1** AIR HOIST. — Gardner-Denver Co. A new 5 cyl. radial air motor to power the new Gardner-Denver line of single and double drum air hoists is described in detail in the New Machinery Section.

**2** BUCKETS.—Blaw-Knox Co. has prepared a 40-page illustrated catalog (No. 1696) on buckets for single drum hoists. Also included are numerous service hints and application data.

**3** CARS, TRUCK BODIES AND SEMI-TRAILERS.—Easton Car & Construction Co. Bulletin 210-A is a profusely illustrated 47-page presentation of the complete line of Easton cars and truck bodies for the haulage of stone and other mine and quarry products. Included are many views of the equipment actually in use.

**4** CASTINGS, MANGANESE STEEL.—The Frog, Switch and Mfg. Co. Bulletin 202 describes and illustrates the various types and sizes of abrasive resisting wearing parts it can furnish for the rock products industry.

**5** CENTRIFUGAL PUMPS. — Fairbanks, Morse & Co. Bulletin 5810D is about the Fairbanks, Morse single stage split case centrifugal pumps and includes complete selection tables, typical specifications, and other engineering information.

**6** CHAINS AND SPROCKETS. — Jeffrey Mfg. Co. Catalog 725 contains information, sizes and capacities of the complete line of Jeffrey steel drive chains and sprockets. It also includes useful engineering data for using proper chains.

**7** CLASSIFIERS. — The Dorr Co., Inc., has developed the "Robot" lifting device for Dorr classifiers. It is illustrated and explained in the New Machinery and Equipment Section.

**8** CLAMSHELL. — Harnischfeger Corp., has designed its model 955 LC clamshell-equipped crane with a novel cab extension to enable it efficiently to carry out work ordinarily requiring a gantry-type unloading crane. It is described and illustrated in the New Machinery Section.

**9** CROSS-DRUM BOILERS.—Babcock & Wilcox Co. has issued a 16-page bulletin No. G-28 describing its Design 32 Cross-Drum boiler, a straight-tube, sectional-header unit of moderate cost, for pressures of 250 lb. or less; and with heating surface from 1000 to 6000 sq. ft.

**10** CRUSHER.—Iowa Manufacturing Co. Bulletin K-1 describes by word and diagram the principle of its "Kubit" impact breaker for producing cubical aggregates. Photographs of the character of the product obtained also are presented.

**11** CONCRETE PRODUCTS EQUIPMENT. —Jackson & Church Co. has issued a circular about its line of equipment for the concrete products manufacturer which features its new Vibr-Rite plain pallet stripper—a small, hand operated concrete block machine capable of making up to 900 blocks a day.

**12** CONVEYORS. — Link-Belt Co. "Link-Belt Conveyors in American Industry" is a 48-page booklet illustrating many different applications of mechanical elevating and conveying equipment for handling materials. Many views are drawn from the rock products industry and others are applicable to it.

**13** CRUSHERS. — Diamond Iron Works, Inc. Catalog 5-40-J is about the operation, features and applications of Diamond portable crushers manufactured in sizes ranging from 9 x 16 to 10 x 24 in.; and catalog D40D contains the same kind of information about the Diamond jaw crushers.

**14** DIESEL ENGINES.—Caterpillar Tractor Co. Form 5899 shows several sand and gravel plants using Caterpillar Diesels and tells about the performance and operating cost of the units at each plant.

**15** DUST COLLECTOR.—Northern Blower Co. Bulletin 163-1 details operation, capacities and features of the Norblo bag type dust arrester, which is said to be a reliable, moderately priced arrester for ordinary dust collecting systems.

**16** DUST COLLECTORS. — Western Precipitation Corp. has issued a 24-page booklet which contains a historical introduction of the principle of electrical precipitation and its development by Dr. F. G. Cottrell. The Cottrell process is described and well illustrated with views of various types of installations.

**17** EXCAVATORS.—Bucyrus-Erie Co., has issued a circular No. W-28 describing and illustrating its 10-B, ⅜-cu. yd. shovel. Twenty features of this convertible excavator with a rating of 5 cycles per minute are presented.

**18** EXCAVATORS.—General Excavator Co. Catalog 3902 gives the features of its Type 30 line, consisting of ½-, ⅝- and ¾-cu. yd. machines as shovel, dragline, crane, clamshell, pullshovel, skimmer, truck shovel, and crane, and with special wheel mount.

**19** GRADING EQUIPMENT.—R. G. LeTourneau, Inc., has released a new 32-page general catalog describing and illustrating the entire LeTourneau line and services, the construction and manufacture of the different machines, and the Tournacar welding service.

**20** HAULING AND DUMPING UNITS.—Brooks Equipment & Mfg. Co. has issued a circular, Form 1505-K, which describes economies and advantages and contains many operating views of the Brooks Load Lugger for hauling and dumping material wherever loading is done by hand.

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**21** HOSE.—United States Rubber Co., Mechanical Goods Division. "U. S. Hose Hints" is a 34-page booklet which is designed to enable customers to get more service out of the various types of hose used and to help select the proper hose for specific purposes.

**22** IMPACT DISINTEGRATOR.—Stedman's Foundry & Machine Works. Bulletin No. 506 is about the Stedman impact-type single cage disintegrators for selective crushing. It features the operation of this crusher and the character of the aggregate produced in various sizes.

**23** PLANT EQUIPMENT.—Allis-Chalmers Mfg. Co. has issued a complete directory which lists in numerical order more than 350 separate bulletins and other engineering aids now available.

**24** PORTABLE CRUSHING PLANT.—Eagle Crusher Co., Inc. Form 138 describes the Eagle portable crushing, screening and loading gravel and quarry plants and the features, specifications and operation of the various units in this plant.

**25** PRECAST CONCRETE JOISTS.—The Superock Co. A 50-page booklet describes the design of Superock joists, the kind to be used with any type of floor or roof slab, and the manufacture of the joists, including incidental equipment used.

**26** PUMPS.—Allis-Chalmers Mfg. Co., Tractor Division has introduced a line of centrifugal pumps driven by gasoline power units which are said to be particularly suitable for aggregates plants requiring independent sources of power. Described in the New Machinery Section.

**27** PUMPS.—Sterling Machinery Corp. Catalog No. 38 is about the features and operation of Sterling self-priming stationary and portable pumps. It also contains information and tabulations useful for proper operation of pumps under varying conditions and for various purposes.

**28** READY-MIX BATCH METER.—Automatic Liquid Meter Co. has issued a circular outlining 30 features of its model "O" Repeat-O-Matic meter for accurately measuring water going into the batch of cement and aggregates.

**29** ROCK DRILLING EQUIPMENT.—Gardner-Denver Co. has issued the eleventh edition of bulletin GP which presents in detail the complete line of Gardner-Denver rock drilling equipment and accessories.

**30** SCRAPER.—Bucyrus-Erie Co., has developed a two-wheel hydraulic scraper, known as the H-28, designed for use with tractors rated at 25 to 35-hp. A detailed description appears in the New Machinery Section.

**31** SCREENS.—Nordberg Mfg. Co. Bulletin 78 begins with an outline of seven features of Symons screens and then describes and illustrates these features in detail. The bulletin also contains several pages of diagrams of unusual screening combinations.

**32** SPRAY NOZZLES.—Spraying Systems Co., has placed on the market a flat spray nozzle. This is described and illustrated in the New Machinery Section.

**33** SCREENS, AGGREGATE.—Cross Engineering Co. has issued a bulletin about its line of perforated metal for aggregates screens. Included is information of the various types available and tabulations of round, square, hexcreen and slot perforations commonly used in sizing.

**34** SCREENS, VIBRATING.—Deister Machine Co. Bulletin 26 describes the general construction, operation and application of the Deister Flat-O vibrating screen. Also included is information about other Deister equipment.

**35** SCREENS, VIBRATING.—Screen Equipment Co., Inc., has issued a new catalog about its complete line of vibrating screens. It contains illustrations and diagrams of the various models with their capacities and features.

**36** SHOVEL.—Marion Steam Shovel Co., has made several improvements in its type 372, 1¾-cu. yd. shovel which is also being used extensively as a crane, dragline and clamshell. Some of its features are presented in the New Machinery Section.

**37** TRACTOR, DIESEL.—Caterpillar Tractor Co., has designed and is now marketing a 75-drawbar horsepower Diesel D7 tractor featuring ease of operation and reduced weight without sacrificing strength. The New Machinery Section contains a description of this tractor.

**38** TRUCK-DRIVES.—Thornton Tandem Co. has issued a bulletin about the Thornton four-rear-wheel drive when built into the Chevrolet truck. It describes and illustrates the drive itself, advantages of using it, and results obtained by different users.

**39** TRUCKS.—Koehring Co. has issued an illustrated bulletin about the Koehring Dumptor, its features of easy operation in forward or reverse with the same three speeds, its flexibility as a loading and hauling unit, and its construction.

**40** WIRE ROPE.—Bethlehem Steel Co. has issued a booklet, "Bethlehem Wire Rope—General Information for Wire Rope Users." As the title suggests it presents the sizes, fabrication, types, and proper use of wire rope.

**41** WIRE ROPE.—Broderick & Bascom Rope Co. has issued a circular describing and showing the use under trying conditions of its "Flex-Set" preformed yellow strand special LeTourneau rope. It has been specially made to meet the requirements of R. G. LeTourneau, Inc.

**42** WIRE ROPE.—Macwhyte Wire Rope Co. has published a handbook called "D-11 Macwhyte Wire Lines for Drilling" which contains specifications, recommended practices, and information on the use and abuse of wire lines for rotary, cable tool, and other operations.

***Detach and Send Us This Post Card ↓***

(4-40)

ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago, Ill.

I would like to have the items circled.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 | 41 | 42 | | | |

Name .....(Position).....

Company .....

Street .....

City & State .....

## Sand Lime Brick Production and Shipments

TEN ACTIVE sand-lime brick plants reporting for February and ten for January, statistics for which were published in March.

AVERAGE PRICE FOR FEBRUARY

| | Plant Price | Delivered Price |
|---|---|---|
| Detroit, Mich. | ..... | $14.50 |
| Grand Rapids, Mich. | ..... | 14.00 |
| Milwaukee, Wis. | $10.00 | 12.00 |
| Mishawaka, Ind. | 10.50 | ..... |
| Saginaw, Mich. | 10.90 | ..... |
| St. Louis Park, Minn. | 8.50 | 10.00 |
| Seattle, Wash. | 14.50 | 16.50 |
| Syracuse, N. Y. | 14.00 | 20.00 L/C 16.00 C/L |

STATISTICS FOR JANUARY AND FEBRUARY

| | †January | ‡February |
|---|---|---|
| Production | 800,410 | 1,055,342 |
| Shipments (rail) | 72,000 | 44,000 |
| Shipments (truck) | 1,034,220 | 1,145,345 |
| Stock on hand | 1,319,591 | 1,377,858 |
| Unfilled orders | 1,010,000 | 770,000 |

†Ten plants reporting: incomplete, one not reporting production, three not reporting stock on hand and five not reporting unfilled orders.

‡Ten plants reporting: incomplete, one not reporting production, three not reporting stock on hand and five not reporting unfilled orders.

## Gypsum Shows Big Gains

BUREAU OF MINES reports a very substantial increase in activity in the gypsum industry during 1939 as compared with the previous year. Increases were shown in practically all classifications.

Total quantity of crude gypsum mined in 1939 amounted to 3,195,596 tons, an increase of 20 percent; imports jumped to 1,308,078 tons, an increase of 66 percent; portland cement retarder totalled 811,329 tons, a 21 percent increase; base-coat plaster totalled 1,400,232 tons, an increase of 21 percent. Sales of all building plasters and Keene's cement were higher in 1939 than for 1938.

Since 1933 there has been a persistently expanding market for gypsum lath, and 1939 set the record with a total of 1,137,103,000 sq. ft., an increase of 41 percent over 1938. Wallboard sales amounted to 410,989,000 sq. ft. in 1939, an increase of 11 percent. Tile sales for 1939 totaled 30,170,000 sq. ft., a gain of 51 percent over 1938.

## Concrete Pavement Yardage

AWARDS of concrete pavement for February, 1940, have been announced by the Portland Cement Association as follows:

| Type of Construction | Sq. yds. awarded during Feb. | Total sq. yds. during first 2 months |
|---|---|---|
| Roads | 2,296,504 | 4,026,691 |
| Streets and Alleys | 825,048 | 1,691,684 |
| Airports | 170,889 | 216,990 |
| Totals | 3,292,441 | 5,935,365 |

# FINANCIAL NOTES

RECENT DIVIDENDS ANNOUNCED

| | | |
|---|---|---|
| Basic Dolomite | $0.12½ | Mar. 15 |
| Canada Cement Co., pfd. | 1.25 | Mar. 20 |
| Ideal Cement Co. | .35 | Mar. 30 |
| Lone Star Cement Corp. | .75 | Mar. 29 |
| Longhorn Portland Cement Co. | .25 | Mar. 15 |
| Medusa Portland Cem. Co., pfd. | 1.50 | Apr. 1 |
| Southern Phosphate Co. | .15 | Mar. 30 |
| Superior Portland Cem. Co., Cl. B | .50 | Apr. 12 |
| Superior Portland Cem. Co., Cl. A | .82½ | Apr. 1 |
| U. S. Gypsum Co. | .50 | Apr. 1 |
| U. S. Gypsum Co., pfd. | 1.75 | Apr. 1 |
| Yosemite Portland Cement Co., pfd. | .05 | Apr. 1 |



ARUNDEL CORP., Baltimore, Md., reports for 1939 that sales of sand, gravel, crushed stone and slag increased 1.63 percent over 1938; ready mixed concrete showed an increase of 27 percent. President J. V. Hogan, in his annual report, said, "We believe that tonnage this year will increase materially over 1939, and we have at this time a substantial backlog of orders on hand." Net income in 1939 was $763,207 as compared with $1,007,783 in 1938.

•

MISSOURI PORTLAND CEMENT CO., St. Louis, Mo., had net profits in 1939 of $376,655. This compares with $134,304 in 1938. Net sales in 1939 totaled $3,364,557, as compared to $2,836,832 in 1938.

•

PEERLESS CEMENT CORP., Detroit, Mich., had a net income of $250,673 in 1939. This compares with a net income of $7971 in 1938.

•

UNITED STATES GYPSUM CO., Chicago, reported sales of $44,126,000 in 1939, compared with $35,712,000 in 1938. Net income in 1939 was $7,365,847; the 1938 net income totaled $4,725,497. January, 1940, sales were up 10.9 percent over the same month a year ago, and February sales rose 18.7 percent. Sewell L. Avery, chairman of the board, said the sales department has been expecting about a 10 percent increase in volume for the year. On March 6, 1940, stockholders approved a profit participation plan for key employes of the company. Under the plan, no participation will be permissible until after company has earned $7 a share on preferred stock and $3 a share on common.

•

INDUSTRIAL SILICA CORP., Youngstown, Ohio, had a net profit of $105,864 in 1939 compared with a loss of $1999 in 1938. Sales during 1939 were 60 percent above 1938, and sales for the first two months this year are running 40 percent above January and February in 1939, according to President L. M. Hansen.

•

LEHIGH PORTLAND CEMENT CO., Allentown, Penn., has reported a net income of $2,257,221 for the calendar year 1939. This compares with $704,003 in 1938. Net sales in 1939 were $14,804,465 as compared with $12,073,737 in 1938. President J. S. Young announced in the annual report that in 1939 approximately $4,350,000 was spent on capital additions and improvements. Of the total, $2,500,000 was spent in reconstruction of the Alsen plant, which is expected to be

ready for operation by April 1, 1940; modernization of Union Bridge plant was completed in July, 1939, at a total cost of $1,450,000; $200,000 was spent at Fogelsville in construction of a new stone storage building and improvements in the crushing department; and approximately $100,000 at Oglesby for installation of five unit coal pulverizers.

•

National Gypsum Co., Buffalo, N. Y., as a result of plant expansions and increased building construction, increased its 1939 net income by 58 percent over 1938. Gross sales amounted to $13,021,781 in 1939 as compared with $9,829,872 in 1938. President Melvin H. Baker announced that the new board plant and other important additions to the New York property will be finished in time for spring business. Net income for the calendar year of 1939 amounted to $1,455,237; for 1938 the figure was $921,632. For the first two months of 1940, there was an increase in sales over the same period a year ago, but earnings declined due to expenses arising from unusual repairs required during the period. These expenses, however, are non-recurring.



Pacific Portland Cement Co., San Francisco, Calif., reported a 15.2 percent gain in sales for 1939 over 1938. Net profit for 1939 was $300,702, after all charges, compared with a net profit of $197,712 in 1938. Net sales in 1939 were $3,631,656 as against $3,153,579 in 1938.

•

Pacific Coast Aggregates, Inc., San Francisco, Calif., showed a consolidated net loss of $28,060 for the year ended December 31, 1939. This compares with a net loss of $114,241 for 1938. Operations were profitable for the last half of 1939. Sales of the company amounted to $1,690,518 in 1939 compared with $1,945,221 in the preceding year. Capital expenditures of $323,995 were made during the year.

•

Riverside Cement Co., Los Angeles, Calif., reported a net income of $208,553, after all charges, as compared with a net income of $331,217 in 1938.

•

Southern Phosphate Corp., Baltimore, Md., with four plants in Florida, reported a net income of $98,221 in 1939 as compared with $187,506 in 1938.

•

Medusa Portland Cement Co., Cleveland, Ohio, announced a net profit of $412,583 in 1939 which compares with a net loss of $55,155 a year before. J. B. John, president, in his report said that increased demand for cement in 1939 enabled the company's plants to work 1810 plant days compared with 1727 in 1938. The company produced 32.78 percent more cement than the year before, thereby reducing manufacturing costs 11.19 percent. Net sales were $6,114,497 in 1939 as compared with $4,878,771 in 1938.

•

Longhorn Portland Cement Co., San Antonio, Texas, had a net income of $577,560 in 1939 as against $491,793 in 1938.

•

Standard Silica Corp., Chicago, Ill., with plant at Ottawa, Ill., reports a net profit of $34,284 in 1939 as compared with a deficit of $5703 in 1938. Net sales were $290,503 in 1939 as against $184,524 in 1938.

•

Coplay Cement Mfg. Co., Coplay, Penn., reports a surplus for the year ended December 31, 1939, of $35,876. This compares with a deficit of $49,851 in 1938.

•

Basic Dolomite, Inc., Cleveland, Ohio, showed a net profit of $320,299 in 1939, after charges, compared with $36,857 in 1938.

OREGON PORTLAND CEMENT CO., Portland, Ore., has reported a net profit of $105,528 for the year ended December 31, 1939. This compares with $67,565 for the 1938 calendar year. Sales showed an increase of 23.8 percent over the preceding year. Orders on hand at the start of 1940, according to H. L. Knappenberger, vice-president and general manager, amounted to 60,000 bbl. Sales of limestone for sugar manufacture and agricultural limestone showed a decided increase.

•

CORONET PHOSPHATE CO., New York, N. Y., with plant at Coronet, Fla., reports a net income of $55,089 for the year ended December 31, 1939 as compared with $55,497 in 1938.

•

AMERICAN LIME & STONE CO., Bellefonte, Penn., reported a net loss of $1317 for the year ended December 31, 1939 as against a deficit of $36,640 in 1938. Sales in 1939 amounted to $1,050,578 as compared with $865,220 in 1938.

•

FEDERAL PORTLAND CEMENT CO., INC., Buffalo, N. Y., reports a net loss of $22,195 in 1939 as compared with a net profit of $8144 in 1938.

•

HAWKEYE PORTLAND CEMENT CO., Des Moines, Iowa, announced that the 1939 profit was $100,283, after taxes. Current assets are reported as seven times the current liabilities.

•

GREAT LAKES PORTLAND CEMENT CO., Buffalo, N. Y., had a net income of $29,579 for the year ended December 31, 1939, as compared with $2,558 in 1938. Sales in 1939 totaled $1,204,892 as against $1,050,578 in 1938.

•

CRYSTALITE PRODUCTS CO., Los Angeles, Calif., producer of special aggregates, reports for the six months ended December 31, 1939, a net profit of $3015, after all charges, including depreciation and provision for federal income taxes. Morris B. Miller, president, reported that most of the earnings were derived from November and December operations.

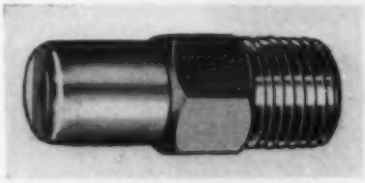
•

PENNSYLVANIA-DIXIE CEMENT CORP., New York, N. Y., has reported a net profit of $361,786 after depreciation, interest, federal income taxes, for the year ended December 31, 1939. This compares with a net profit of $86,716 for the same period in 1938. Sales for 1939 totaled $6,216,754 as against $6,024,810 in 1938.

# NEW MACHINERY * NEW EQUIPMENT

## Flat Spray Nozzles

SPRAYING SYSTEMS CO., Chicago, Ill., has placed on the market a flat spray nozzle. The spray is of the flat type with slightly heavy center, and it may be obtained in a number of different spray angles. Nozzles have a ¼-in. male pipe connection. Capacities range from 1.5 to 3.5 g.p.m. at 10-lb. pressure and 3 to 7 g.p.m. at 40-lb. pressure. The nozzles may be obtained in brass or all iron, but other metals can be specified. These nozzles have



Type U flat spray nozzle

many applications; such as rinsing aggregates, cleaning metal pallets in concrete products plants, and also for wet curing of concrete units.

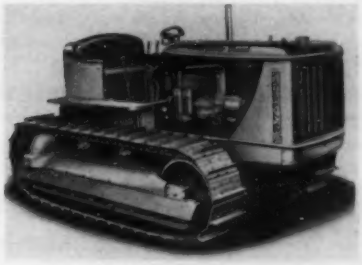
## Automatic Lifting Devices for Classifiers

THE DORR CO., INC., New York, N. Y., has developed what they have called the Robot lifting device for Dorr classifiers. This device, shown in the illustration, automatically raises the rakes clear of the segregating pulp pool in case of a failure in the main power line.

As usual, the classifier is driven by an a.c. motor, but the Robot lifting device is operated by a ½-hp. motor on a 32-volt d.c. battery circuit, charged by an a.c./d.c. rectifier. A relay starts the d.c. motor if the a.c. power line fails. A limit switch stops it when the rakes reach maximum elevation. When the main power line is returned to service, the rakes may be lowered step-by-step by push button control. The Robot device is optional equipment on all heavy-duty classifiers.

## Welded Steel Diesel Tractor Cuts Down Weight

CATERPILLAR TRACTOR CO., Peoria, Ill., has designed and is now marketing a 75-drawbar horsepower Diesel D7 tractor which features ease of



Hydraulically operated steering clutches reduce fatigue in operating Diesel tractor

operation and reduced weight without sacrificing strength. To reduce operator fatigue, this tractor has "finger tip" steering in which the actual work is done through steering clutches operated hydraulically through a valve by a separate control unit driven from the upper transmission shaft. Wherever possible welded steel construction is used to cut down weight. For example, the frame and steering clutch case are welded into a one-piece unit.

The tractor is powered by a four-cylinder, valve-in-head Caterpillar Diesel engine. It has a bore and stroke of 5¾- x 8-in., and a full load governed r.p.m. of 1000. Belt horsepower is 87; drawbar, 75. To provide a broad range of speeds, the tractor is equipped with either of two 5-speed transmissions.

## Extended Cab Control For Crawler Mounted Clamshell

HARNISCHFEGER CORP., Milwaukee, Wis., has designed its model 955 LC clamshell-equipped crane with a novel cab extension to enable it to carry out efficiently work ordinarily requiring a gantry-type unloading crane. While this unit was constructed primarily for unloading coal freighters, it may be adaptable for special use in the rock products industries, particularly where loading and unloading of large boats is concerned.

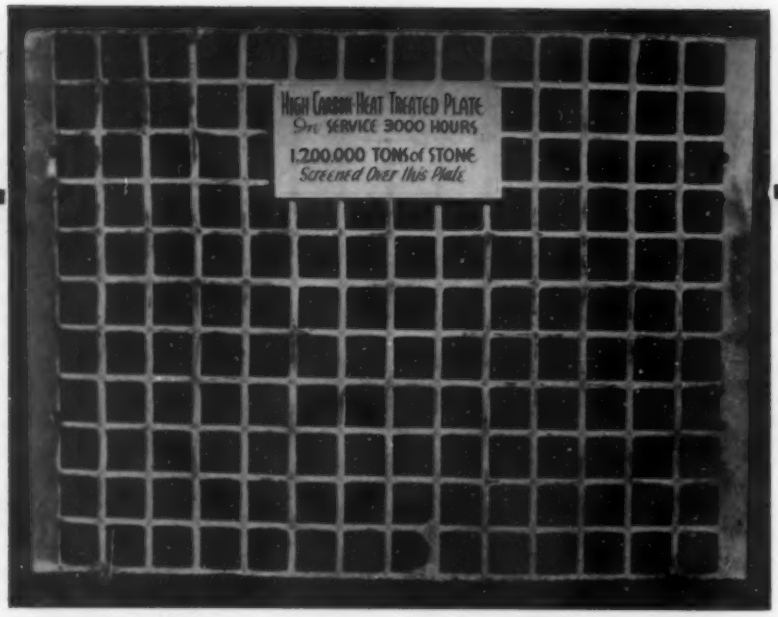
As shown in the illustration, the clamshell is equipped with a 75-ft.

Extension tower permits operator of clamshell to look over decks of freighter

boom, amply long enough to reach the bucket into all parts of the hold. However, in order to allow the operator to have full vision of his work in spotting the bucket and swinging the boom, an extension control cab elevated to a height of approximately 30 ft. above the ground was placed above the standard cab which permits the operator to see over the decks of the freighter. With its 4 cu. yd. bucket and 3½-ton capacity, 5400-ton boats are unloaded in 37 hr., and 6000-ton boats in 44 hr.

On its long crawlers, it can travel up and down the docks for unloading purposes or to any part of the yard for piling, repiling, and rehandling. It is powered by a 175-hp. Caterpillar Diesel engine.

Left: Lifting device with gear cover removed and drive cover in place. Below: Heavy duty classifier equipped with lifting device




# HENDRICK MANUFACTURING CO.

47 Dundaff Street, Carbondale, Pa.

SALES OFFICES IN PRINCIPAL CITIES ● PLEASE CONSULT TELEPHONE DIRECTORY

Makers of Mitco Open Steel Flooring, Hendrick Mitco Shur-Site Treads, Hendrick Mitco Armorgrids.

# The Williams "SLUGGER" Crusher and Pulverizer Handles "ONE MAN" Stone ● Saves Sledging

## Also Makes 1¼", ¾" or Agricultural Limestone in One Operation

CUTAWAY VIEW of "Slugger" showing heavy duty hammers, liners and discs.

By reducing large rock to 1¼", ¾" or agricultural limestone in one operation, the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment.

Features include—Manganese steel hammers, heavy duty SKF bearings, adjustable breaker plate, hammer adjustments overcome wear, economical to operate.

The "Slugger" is built in Seven Sizes—from 30 to 150 horsepower —write for illustrative bulletins today.

**The Williams Patent Crusher and Pulverizer Co.**

800 St. Louis Ave., St. Louis, Mo.

SALES AGENCIES

CHICAGO 37 W. VanBuren

NEW YORK 15 Park Row

OAKLAND, CALIF. 1629 Telegraph Ave.

OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD

**Williams**

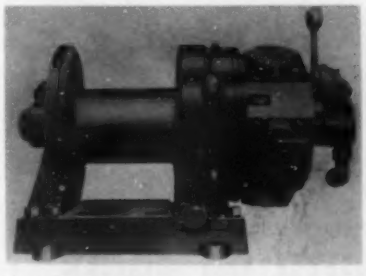
PATENT CRUSHERS GRINDERS SHREDDERS

# NEW MACHINERY

## Air Hoist with Radial Air Motor

GARDNER-DENVER CO., Quincy, Ill., has brought out a 5 cyl. radial air motor to power their new line of single and double drum air hoists. It is said that the overlap of power impulses of this motor exceeds that of a modern 8-cyl. automobile engine. Although the motor has been recently adapted for use on air hoists, it has been used on Gardner-Denver mine car loaders for some time.

The new hoists have small overall dimensions and a low weight per horsepower. They are said to be very well adapted to hoisting, hauling, dragging or scraping in mines, quarries, highway and construction work. Other features of this hoist include: a safety design which makes it impossible to drop a load accidentally; powerful brake bands with conveniently located operating lever; entirely sealed gear train; sealed-in oiling system with three simple points of lubrication; and a throttle lever which is self-centering with an automatic safety latch to hold it in neutral position.



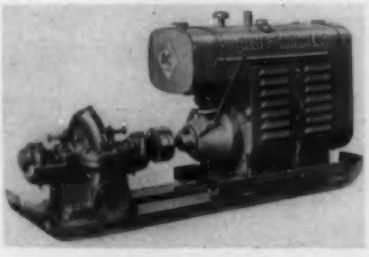
Smooth flow of power with air hoist having a 5 cyl. air motor

## Engine Driven Centrifugal Pumps

ALLIS - CHALMERS MANUFACTURING CO., Tractor Division, Milwaukee, Wis., has introduced a line of centrifugal pumps driven by gasoline power units which are said to be particularly suitable for sand and gravel and crushed stone plants requiring independent sources of power. They also have been used as standby units when other sources of power fail.

Power units are available in five sizes ranging from 18 to 110 hp., and may be operated on gasoline, kerosene, distillate, natural gas, or butane. All power units have valve-in-head medium speed engines, with removable cylinder liners, efficient cooling systems, force feed lubrication and a variable speed governor.

The centrifugal pumps are horizontal shaft, single stage, single or double suction pumps designed for handling liquids at normal temperatures with maximum efficiency. To facilitate handling, the engines and pumps are mounted on a base and are available in many combinations to meet various requirements in quantity and pressure up to 5000 g.p.m. and 100 ft. head.



Centrifugal pump direct-connected to independent power unit

## Two-Wheel Hydraulic Scraper

BUCYRUS-ERIE CO., South Milwaukee, Wis., has developed a two-wheel hydraulic scraper, known as the H-28, designed for use with tractors rated at 25 to 35-hp. It has a struck capacity of 2½ cu. yd., but will, according to the manufacturer, heap to loads of 3 or 4 cu. yd.

The H-28 operates on a low-pressure hydraulic system. It has the "double curve" cutting edge, and it dumps backwards and behind its wheels like a dump truck. The manufacturer claims the "double curve" cutting edge makes loading easy and quick by "boiling" dirt up into both aprons and bowl of the scraper. The back-dumping feature makes it possible to dump its loads over the edge of a bank or a fill; or over the edge of a ramp into trucks or cars.

Two-wheel scraper going into action

## Improvements Made In Convertible Shovel

THE MARION STEAM SHOVEL CO., Marion, Ohio, has made several improvements in its type 372, 1¾-cu. yd. shovel which is also being used extensively as a crane, dragline, and clamshell.

Among the features of this machine is the main lower frame which has deep, heavy castings for strength and stamina. The rotating gear, which is shouldered into and securely bolted to a machine pad on top of the lower frame, is a one-piece heat-treated steel casting. It has a wide face for reduced tooth pressures and the outside teeth, cut from the solid, are generated so that all teeth are exactly alike.

The operating machinery is mounted on an upper frame of a multiple-webbed base and machinery castings; a construction which provides for proper and permanent alignment. The V-block type rotating clutches are vacuum controlled.


Large capacity shovel which was developed to handle high yardage under severe digging conditions

# Traffic and Transportation

*PROPOSED RATE CHANGES—The following are the latest proposed changes in freight rates up to and including the week of March 16:*

## Central

61409. **Sand**, naturally bonded moulding, in all kinds of equipment, C. L., sand (except industrial) in closed equipment, C. L. (b) Sand, ground or pulverized, in all kinds of equipment, C. L.; (c) Sand (except industrial) in open top equipment, C. L. (See Note 6). Establish rate on from Sandy Hook, Ind., to destinations in Ind., Ill., and Mo., as follows:

| Representative Destinations | Proposed Rates A | B | C |
|---|---|---|---|
| Anderson, Ind. | 187 | 206 | 149 |
| Columbus, Ind. | 165 | 182 | 127 |
| Crawfordsville, Ind. | 176 | 184 | 138 |
| Evansville, Ind. | 121 | 133 | 94 |
| Fort Wayne, Ind. | 231 | 254 | 220 |
| Huntington, Ind. | 220 | 242 | 204 |
| Kokomo, Ind. | 187 | 206 | 149 |
| LaFayette, Ind. | 187 | 206 | 149 |
| Michigan City, Ind. | 231 | 254 | 220 |
| Muncie, Ind. | 187 | 206 | 149 |
| Pendleton, Ind. | 176 | 184 | 138 |
| Peru, Ind. | 198 | 218 | 160 |
| South Bend, Ind. | 231 | 254 | 220 |
| Terre Haute, Ind. | 143 | 157 | 105 |
| Aurora, Ill. | 231 | 254 | 220 |
| Bellville, Ill. | 187 | 206 | 149 |
| Chicago, Ill. | 220 | 242 | 204 |
| Decatur, Ill. | 187 | 206 | 149 |
| Elgin, Ill. | 242 | 266 | 237 |
| Hoopeston, Ill. | 176 | 184 | 138 |
| Mt. Vernon, Ill. | 165 | 182 | 127 |
| Pekin, Ill. | 220 | 242 | 204 |
| Peoria, Ill. | 220 | 242 | 204 |
| Rockford, Ill. | 253 | 278 | 253 |
| Springfield, Ill. | 198 | 218 | 160 |
| St. Louis, Mo. | 198 | 218 | 160 |

61420. **Sand**, naturally bonded moulding, in all kinds of equipment. (a) Sand (except industrial), in closed equipment (See Note 6). (b) Sand, ground or pulverized, in all kinds of equipment (Note 6). (c) Sand (except industrial), in open top equipment. Establish rates from Hamilton and Overpeck, Ohio, to Indianapolis, Ind. (a) 154, (b) 169, (c) 116c per net ton.

61482. (a) Sand (except industrial), and gravel, in open top equipment, C. L. (See Note 6). (b) Sand (except industrial), and gravel, in closed equipment, C. L. Establish rates on from Charden, Ohio, to Alloy, W. Va., 275c per net ton.

61469. **Crushed stone**, fluxing, furnace, foundry, melting or refractory, unburnt in bulk, C. L. Establish on, from Calcite, Mich., to Niagara Falls, N. Y., 210c per net ton.

61494. **Sand** (except industrial), in open top cars, C. L. Establish rate of 124c per net ton from Terre Haute, Ind., to E. Odin, Ill.

61528 (2). **Industrial sand**, as per usual descriptions of (a), (b) and (c). Establish on, from Dresden, Ohio, to Westmoreland, N. Y.—(a) 363c; (b) 399c, and (c) 363c net ton., via P. R. R. Wilkes-Barre, Penn., D. & H., Jermyn, Penn., N. Y. O. & W.

Sup. 1 to W. D. A. 61554. **Ground or pulverized limestone**, in box cars, C. L., min. wt. 60,000 lb. Establish rates on, from Sibley, Mich., to destinations in Penn., is hereby amended by substitut-

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.

ing the following proposed rates for those shown in Exhibit A attached thereto, viz. To Thornton, Girard, North Girard, Wallace Jct., Cranesville, Albion, Fairview, Erie, North East, 226c; Union City, 237c; Linesville, 226c; Corry, 248c; Meadville Jct., 226c; Meadville, Cambridge Springs, 237c; Titusville, 259c; Franklin, 237c; Osgood, Amasa, 226c; Lottsville, Bear Lake, Garland, 248c; Youngsville, Irvineton, Warren, Kinzua, Clarendon, Sheffield, Sheffield Jct., W. Hickory, Tionesta, Tidioute, Westline, 259c; Mt. Jewett, Kane, 270c; Bradford, Backus, 259c; Wilcox, Johnsonburg, 270c; St. Marys, 281c; Clermont, Smethport, 270c; Larabee, State Line (McKean Co.), Eldred, 259c; Pt. Alleghany, Genesee, 270c; New Field, 281c; Galeton, 292c; Roulette, Coudersport, Keating Summit, 270c; Emporium, Austin, Costello, Wharton, 281c; Keating, 303c; Westfield, 292c; Elkland, 303c; Lawrenceville, Tioga, 292c; Mansfield, Morris Run, Blossburg, Arnot, Hoytville, Antrim, Millerton, Fassatt, Wellsboro Jct., Wellsboro 303c; Ansonia, Gaines Jct., 292c; Cammal, Troy, Canton, 303c; Ralston, 314c; Waverly, Sayre, Athens, Towanda, 303c; Tunkhannock, 325c; Monroeton, 303c; Martin, Satterfield, 314c net ton.

61666. **Stone, crushed,** in open top cars, C. L. Establish on, from Gibsonburg and Woodville, O., to Scippo, O., 138c; Vauces, O., 149c; Stockdale, O., 160c, and Wheeler, O., 171c net ton.

61675 **Lime,** common, hydrated, quick or slaked, also agricultural and fluxing. (See note.) Establish on, from Gibsonburg and Woodville, O., min. wt. 30,000 lb., to Scippo, O., 14c; Wheeler, O., 15c; min. wt. 50,000 lb.; to Scippo, O., 11c, and Wheeler, O., 12c. Note— Will not apply on agricultural lime in Ohio via intrastate routes.

61763. **Limestone,** ground or pulverized, unburnt, C. L., min. wt. 60,000 lb. Establish on, from Nario and other Northwestern Ohio Group 1 origins, to C. & O. Ry. destinations in Kentucky, viz.: Maysville, Vanceburg, 226c; South Portsmouth, 215c; Poplar, Princess, 226c; Hitchins, Leon, Olive Hill, 237c; Soldier, Morehead, Bluestone, 248c; Mt. Sterling, 259c per net ton.

61764. **Limestone,** ground or pulverized, unburnt, C. L., min. wt. 60,000 lb. Establish on, from Nario, O., and other Northwestern Ohio Group 1 origins, to Helena, Stanton, Slade, Glencairn, Ky., 259c; Beattyville, Ky., 270c; Irvine, Ky., 259c per net ton.

61771. **Crude** or **pulverized limestone,** unburnt, C. L., min. wt. 60,000 lb. Establish on, from Greencastle, Ind., to various points as follows to (Repr.): Akron, Ohio, 259c; Ann Arbor, Mich., 237c; Ashland, Ohio, 237c; Barberton, Ohio, 259c; Battle Creek, Mich., 226c; Bedford, Ohio, 259c; Buffalo, N. Y., 325c; Cadillac, Mich., 281c; Canton, Ohio, 259c; Carmi, Ill., 182c; Chardon, Ohio, 281c; Cincinnati, Ohio, 182c; Cleveland, Ohio, 259c; Columbus, Ohio, 215c; Cuyahoga Falls, Ohio, 259c; Detroit, Mich., 248c; Erie, Pa., 303c; Fairmont, W. Va., 303c; Flint, Mich., 259c; Galesburg, Ill., 226c; Garrettsville-Hiram, Ohio, 270c; Grand Rapids, Mich., 237c; Hannibal, Mo., 237c; Hartville, Ohio, 259c; Howell, Mich., 248c; Ironton, Ohio, 248c; Jeannette, Pa., 303c; Kalamazoo, Mich., 215c; Louisville, Ky., 182c; Mansfield, Ohio, 226c; Marietta, Ohio, 259c; Marshall, Mich., 226c; Massillon, Ohio, 259c; Milwaukee, Wis., 237c; Moline, Ill., 237c; Muskegon, Mich., 248c; Newark, Ohio, 226c; Pittsburgh, Pa., 303c; Pontiac, Mich., 259c; Ravenna, Ohio, 270c; Richmond, Mich., 259c; Rockford, Ill., 226c; St. Clair, Mich., 270c; St. Louis, Mo., 215c; Sandusky, Ohio, 237c; Sturgis, Mich., 215c; Toledo, Ohio, 226c; Urbana, Ill., 165c; Wadsworth, Ohio, 259c; Willoughy, Ohio, 270c; Zanesville, Ohio, 237c.

61802. **Fluorspar,** C. L., min. wt. 40,000 lb. Establish on, to Wallaceburg, Ont., Can., from Cerulean, Crayne, Crider, Fredonia, Marion, Mexico, Princeton, Ky., Cochrans Spur, Eichorn, Rosiclare and Stewart, Ill., 578c; Brookport, Golconda, Homberg, Metropolis, Ill., and Evansville, Ind., 545c per ton.

61850. **Sand** (except industrial), in closed equipment, and in open top equipment (see Note 6), C. L. Establish on, from Michigan City, Ind., group to Delphi, Ind., 154c in closed equipment and 110c net ton in open top equipment.

Sup. 1 to W. D. A. 61772. **Ground** or **pulverized limestone,** in box cars, C. L., min. wt. 60,000 lb. Establish rates on, from Sibley, Mich., to various points in New York, is hereby amended by substituting the following proposed rates for those shown therein, viz. To Addison, 281c; Alfred, 270c; Arcade, 248c; Attica, 237c; Avon, 259c; Batavia, 248c; Bath, Belvidere, 270c; B. R. & P. Jct., Caledonia, 248c; Caneseraga, 259c; Canisteo, 270c; Ceres, 259c; Corning, 281c; Cuba, Dansville, 259c; Elmira, 292c; Friendship, Garbutt, Greigsville, Hinsdale, Hornell, 259c; Horseheads, 292c; Kanona, 270c; LeRoy, Machias, 248c; Moraine, 270c; Mortimer, Mt. Morris, Olean, 259c; Painted Post, 281c; Perry, 259c; Prattsburg, 281c; Retsof, Retsof Jct., 259c; Rock Glen, 248c; Scottsville, Silver Springs, Swain, 259c; Warsaw, 248c; Wellsville, 270c net ton.

61780 (2). **Lime,** straight or mixed C. L., min. wt. Col. A 30,000 lb., Col. B, 50,000 lb., rates to alternate. Establish on, from Keeport, Ind., to Lawrenceville, Ill., Col. A. 15c and Col. B 12c, via Wab. Ry., Danville, Ill., N. Y. C. (C). Other routes on request.

61792. **Lime,** common, hydrated, quick or slaked, C. L., in bags, barrels, casks, iron drums, or in bulk. Establish on,

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You will like the LIMA Type 1201 combination shovel and dragline for its big output in heavy duty digging; its wide working ranges; its accurate, speedy operation and low up-keep cost. The standard shovel is equipped with a 30' boom, 20' dipper handle and a 3 yard dipper, however, where work requires a high lift machine, a 42' boom, 32' dipper handle and a 2½ yard dipper can be furnished. For dragline operation, booms may be had up to 100'. Take a tip from the many LIMA users who are getting maximum results from their investment and make your next excavator a LIMA.

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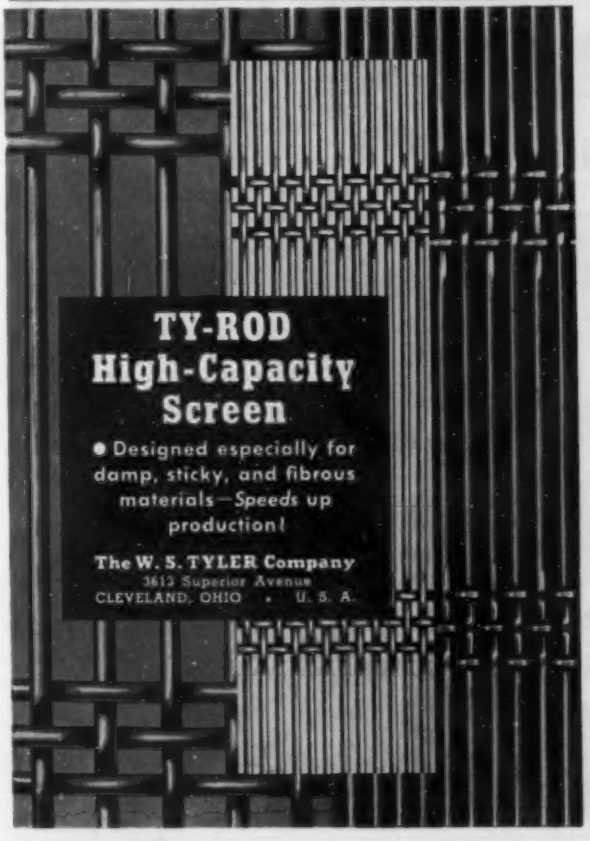


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Jeffrey Heavy Duty Hammer Crushers reduce steam shovel size limestone shale in ONE OPERATION to 1½" and under suitable for storage and for blending as feed to raw grinding mills as in Cement Mill operations. One Jeffrey Crusher will do the work of several primary crushers of other makes. Write for literature.

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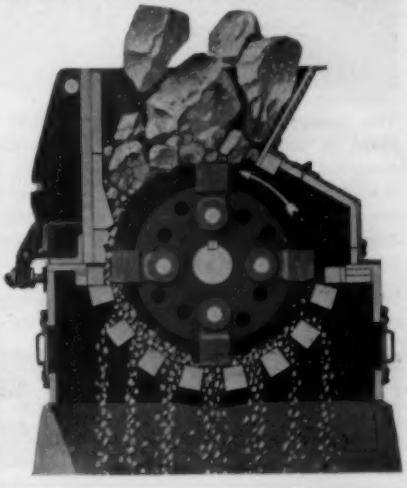


All parts on Jeffrey Heavy Duty Hammer Crushers are extra heavy and rugged to withstand severe and continuous service. Equipped with oversize slugger hammers and furnished with either heavy cast iron or Armorplate steel frames with manganese steel liners.

from Hannibal, Mo., Marblehead, Quincy, Ill. Proposed rates to Sylvania, O., 30,000 lb., 21c; 50,000 lb., 17c; Oberlin, O., 30,000 lb., 23c, 50,000 lb., 19c; and to Granville, O., 30,000 lb., 23c, 50,000 lb., 18c.

E-41-340. Sand and gravel, C. L., from Hawarden, Ia., to Coleman and Flandreau, S. D. Rates: Present—88c per net ton. Proposed—Class rate.

E-41-341. Sand and gravel, C. L., from Janesville and Afton, Wis., to Chaseburg, Wis., Westby, Wis., and Coon Valley, Wis. Rates: Present—7c per 100 lb. Proposed—Class rates.

E-41-342. Sand, gravel, strippings, sand and gravel pit, C. L., from Rock Valley, Ia., and Madison, S. D., to Sioux City, Ia. Rates, present, 121c per net ton. Proposed, class rates.

## Illinois

O. R. M. V. 3950-12. Sand, as per Descr. 1, page 27, Sup. 71, I. F. A. Tariff 74-A, I. C. C. 357, from Ottawa, Ill., district to Miami, Fla. Present—Combination. Proposed—$5.90 net ton.

IRC 6144-1. Sand or gravel, C. L. (See Note 3), but not less than 40,000 lb., from Joppa, Ill.

| To | Present | Proposed |
|---|---|---|
| Odin, Ill. ..... | $1.39 | $1.27 net ton |
| Robinett, Ill... | Combination | $1.27 net ton |

IRC 8144-4. Agricultural limestone, also ground limestone dust and limestone, dust and limestone, ground, C. L., but not less than 60,000 lb., to stations on Mo. Pac. R. R. in Illinois. Proposed rates: 80 miles and under, 66c; 100 miles and over 80, 77c; 125 miles and over 100, 88c; 150 miles and over 125, 99c; 175 miles and over 150, 110c; 200 miles and over 175, 116c.

IRC 9012. Sand (except silica, moulding, etc.), and/or gravel, C. L., from Blackhawk, Ill. to representative points: "A" present, "B" proposed

Davenport, Ia., A 80c, B 52c; Moline, Ill., A 67c, B 52c; Carbon Cliff, Ill., A 78c, B 52c; Colona, Ill., A 95c, B 66c; Geneseo, Ill., A 95c, B 84c; Atkinson, Ill., A 108c, B 84c; Sheffield, Ill., A 122c, B 84c; Coal Valley, Ill., A 88c, B 77c; Galva, Ill., A 101c, B 88c.

## Southern

21496. Phosphatic sand or clay, C. L. Establish from Brewster, Fla., to Reboboth, Cool Springs and Nassau, Del., 509c; Easton, Md., 498c; Denton, Md., 520c net ton.

21829. Sand and crushed stone, C. L. Establish 80c net ton from Mascot and Strawberry Plains, Tenn., to Bristol, Va.-Tenn., Johnson City and Elizabethton, Tenn., and 35c net ton from Watauga to Bristol, Va.-Tenn. Truck competitive.

21832. Sand and gravel, C. L. Establish 125c net ton—Chattahoochee River, Fla., to Yukon, Fla. Expires Dec. 31, 1940.

21852. Sand, C. L. Establish 65c net ton, Gaillard, Ga., to Constitution, Ga. Truck competitive. Expires Dec. 31, 1940.

21887 (shipper; suggested by carrier)—Feldspar, crude, C. L., min. 80,000 lb. Establish 150c net ton, Ridgeway, Va., and Price, N. C., to Brookneal, Va.

## Trunk

Sup. 2 to 38160. Talc tailings, C. L.; soapstone, ground or pulverized; other than soapstone, testing not less than 99% through 200 mesh screen, C. L.; soapstone, crude, not ground or pulverized (not blocks or slabs), C. L., min. wt. 70,000 lb., from Conowingo, Md., to Keycurrent rate of 25c per 100 lb.

38568. Scrap mica and mica ore, crude and waste, in straight or mixed C. L., min. wt. 60,000 lb., from Bancroft, Ont., to Newark, N. J., 36c per 100 lb., in lieu of current fifth class rate of 57c per 100 lb. (See Note 5).

38598. Sand and gravel (except industrial), in open top cars, not covered by tarpaulin or other protective covering; sand and gravel other than industrial, in closed cars or in open top cars with tarpaulin or other protective covering (See Note 3); from Raritan River R. R. stations, McDonough's, N. J., to New Brunswick, N. J., to Smiths Falls, Ont., 29c per 100 lb. Reason—To establish rate same as now applicable via another route.

38613. Crushed stone and screenings, in straight or mixed C. L. (not including agricultural limestone or ground limestone, unburnt; fluxing stone or firestone; or stone coated with oil, tar or asphaltum), (See Note 3), from Monocacy, Penn., to Wheeling, W. Va., $3.36 per net ton, in lieu of 26c per 100 lb., 6th class. Reason: Restoration of rates in effect in 1935, increased under Ex Parte 123.

## Southwestern

19488. Lime. Establish rate of 13c per 100 lb., min. wt. 50,000 lb. on lime, common, viz.: Lump, crushed, pulverized or hydrated, in straight or mixed C. L., from St. L.-S. F. producing points, namely, Johnsons, Ark., Neosho, Pierce City, Sequiota and Springfield, Mo., to Arkansas City, Kan., and intermediate points on St. L.-S. F.

19282. Gypsum, establish rate of $2.30 per ton of 2,000 lb. (see Note 3), but not less than 80,000 lb., on gypsum, crude or crushed (not ground) in bulk from Murfreesboro and Highland, Ark., to Cape Girardeau, Mo.

19737. Lime rock or limestone, broken, crushed or ground, C. L. Establish rate of 226c per ton of 2,000 lb., min. wt. 10 percent less than marked capacity of car, but not less than 40,000 lb., from Ste. Genevieve, Mo., to destinations shown in Item 2310, S. W. L. Tariff 68-P, I. C. C. 3032.

19797. Stone. Establish rate of 15c per 100 lb., min. wt. 50,000 lb., consisting of irregular shaped pieces, each weighing in excess of 200 lb., but not more than 20,000 lb., from Wolquarry Spur, Ark., to Carthage, Mo.

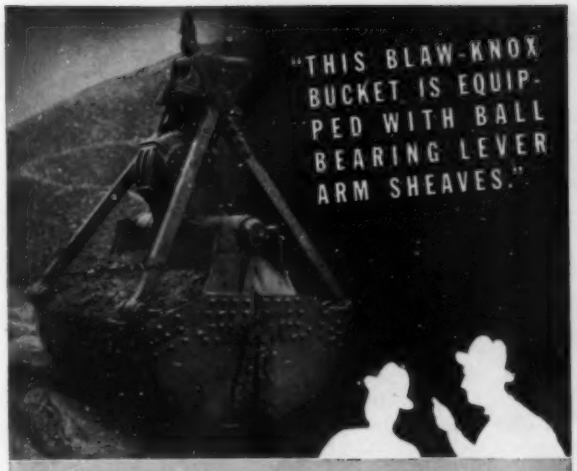
## New England

50073. Ground or pulverized limestone (not whiting), (note), min. wt. 80,000 lb. Note—Will also apply on limestone, broken or crushed, loaded in box cars, or in open top cars covered by tarpaulin or other covering. Rates per ton of 2,000 lb.:

| | From Waltham, Mass. | | Rockland, Me. | |
|---|---|---|---|---|
| | *Pres. | Pro. | *Pres. | Pro. |
| Harlem River, N. Y. ..... | $2.64 | $2.15 | $3.58 | $2.92 |
| Port Morris, N. Y. ..... | 3.41 | 2.26 | 4.35 | 3.03 |
| Westchester Ave., N. Y.... | 3.41 | 2.26 | 4.35 | 3.03 |
| 130th St., N. Y. | 3.41 | 2.37 | 4.35 | 3.03 |
| 60th St., N. Y.. | 3.41 | 2.37 | 4.35 | 3.14 |
| 33d St., N. Y... | 3.41 | 2.37 | 4.35 | 3.14 |
| St. Johns Park, N. Y. ..... | 3.41 | 2.37 | 4.35 | 3.14 |

*As per B. & M. R. R. I. C. C. A-2963 and A-2991 and Me. C. C-4521.

Reason: To establish commodity rates comparable with those now published from other shipping points.

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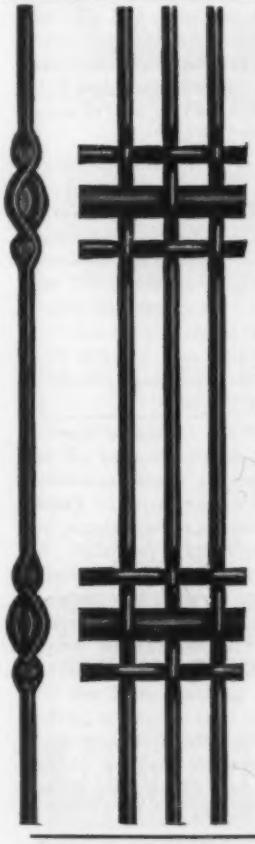

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## Gravel Company Will Dredge for Gold

COOLEY GRAVEL CO., with plants at Chillicothe, Mo., and Gosport, Ind., has received authority from the State of Montana to engage in gold dredging operations near Townsend, Mont. L. M. Cooley, vice-president of the company, will be resident manager. The Cooley dredge will handle about 4000 cu. yd. of material per day. C. J. Cooley, president of the company, has recently returned from Columbia, South America, where he studied prospective dredge and mining locations.

## Mechanization in the Cement Industry

WORKS PROGRESS ADMINISTRATION has published as Report No. M-3 of the National Research Project, "Mechanization in the Cement Industry," by George Perazich, S. Theodore Woal and Herbert Schimmel. The publication is a book of over 100 pages with many tabulations and figures to show how cement manufacturing methods and efficiencies have improved since portland cement came into importance.

The report is the result of a field study and information gleaned from cement plant engineers, cement mill equipment manufacturers, cement chemists and other individuals and organizations prominently identified with the portland cement industry. A study was made in detail of production and productivity trends of the industry for the period 1919-1938. Technological changes in all divisions of a cement plant are traced over a period of years, with a discussion of reasons for these changes, and in some cases an attempt is made to look into the future to predict what types of equipment will be used.

## Court Enjoins Gravel Price Control

FOUR LEADING sand and gravel producers in Pennsylvania, the Western Pennsylvania Sand and Gravel Association, and nine individuals were named in a federal court injunction which enjoined further "conspiring in restraint of interstate commerce" in violation of the Sherman Anti-Trust Act. The grand jury charged those enjoined with price-fixing and resale control. The order was agreed to without contest by the defendants. Companies and individuals named in the injunction were: Dravo Corporation, A. W. Dann, executive vice-president, and Wilber A. Bliss, general manager of the Keystone division; J. K. Davison & Brother, George Davison, president, and H. S. Davison, secretary-treasurer; Iron City Sand and Gravel Corporation, George Vang, president, and W. S. Giles, sales manager; McCrady-Rodgers Co., W. F McCrady, president, and Howard McCrady, vice-president; and Ray V. Warren, named individually and as executive secretary of the association.

## Peru Cement Industry Is Growing

STATISTICS prepared by the Bureau of Mines show that the cement industry has made great strides in Peru in recent years. All of this country's production comes from the plant of the Compania Peruana de Cemento Portland near Lima, the capital. In 1938 this plant consumed 145,967 tons of cement rock and produced 596,350 bbl. of cement. Production increased from 11,278 metric tons in 1925 to 101,370 metric tons in 1938. The country imported 66,737 metric tons in 1925 and only 40,605 metric tons in 1938.

## Gravel Concrete Survey

PENNSYLVANIA has been the scene of much controversy over types of aggregates for concrete highway pavements. To remove some of the prejudice against gravel concrete, the Western Pennsylvania Sand and Gravel Association, consisting of four large producers in Pittsburgh, Allegheny County, had a survey made last fall to determine the service gravel concrete was giving.

Two engineers of national reputation, Harold F. Clemmer, engineer of materials, District of Columbia, and Nathan L. Smith, consulting engineer, Maryland State Roads Commission, made the survey, which covered 60 miles of concrete pavement, 29 miles of which were closely inspected by walking over them and making observations. Stone and slag concrete pavements were included.

The results of the engineers' observations and their conclusions as to the service given by gravel concrete are contained in a report "Field Survey of Concrete Pavements in Western Pennsylvania," published in February by the Western Pennsylvania Sand and Gravel Association, of which Ray V. Warren is secretary and engineer. The conclusions were, briefly, that gravel concrete pavements were in as good as if not in better condition than concrete pavements made with other types of aggregates. The gravels used for these pavements all came from the Ohio and Allegheny Rivers.

## Complete Rebuilding of Lehigh Plant

LEHIGH PORTLAND CEMENT CO. will soon place its rebuilt and modernized Alsen, N. Y., plant into operation. Work on rehabilitating this plant was started in July, 1938, and has been continued without interruption. This plant had been idle for many years. It is reported that the total cost for this work and the new equipment will be approximately $3,000,000.

## Correction

ON PAGE 78 of the February, 1940, issue of ROCK PRODUCTS, a news item appeared under the heading, "Proposed Amendment to Lime Specifications." The National Lime Association was referred to as the source of information concerning the proposed change in Federal Specification SS-L-351, but there was no intent to imply that the association was in any way sponsoring or suggesting the proposed change. The proposed change provides that "The total free (unhydrated) calcium oxide (CaO) and magnesium oxide (MgO) in the hydrated product shall not exceed 8 percent by weight (calculated on the as received basis)." Up to the present no definite action has been taken on this proposed amendment.

## Start Up Crushing Unit for Agstone

LAWRENCE COUNTY LIMESTONE CO., between Black Rock and Imboden, Ark., is a new company which is specializing in the production of agricultural limestone. The plant is equipped with a hammer mill, and a 40-hp. steam boiler furnishes power. The plant has a capacity of 30 tons daily of agricultural limestone.

## War and Cold Weather Boost Mica Prices

WAR CONDITIONS which have cut off foreign imports of mica and unusually cold weather in February which held up mining operations have boosted the price of mica to high levels in the Spruce Pine, N. C., district. Ordinary scrap mica has been selling from $12 to $14 a ton and the best grades have run as high as $19 a ton.

## California Gravel Plant Makes Improvements

PERKINS GRAVEL CO., Sacramento, Calif., producers of washed sand and gravel, crushed rock, and ready mixed concrete, are now installing a 750 bbl. bulk cement plant, comprising a three-compartment steel silo, three Link-Belt conveyors, each 70-ft. centers, and an automatic Fairbanks cement batcher with mercury switch control. A. Teichert & Sons are owners of this company. P. W. Schoeningh is general manager of the plant, and C. A. Williamson is superintendent.



## Lime Shipments Show Increase

NATIONAL LIME ASSOCIATION reports for January, 1940, an increase of lime shipments with relation to capacity of 4.1 percent over January, 1939. The capacity of 142 companies is 574,534 tons. Of 74 companies reporting in January, 1940 with a total capacity of 302,252 tons, shipments totaled 121,901 tons. The ratio, shipments to capacity, was 40.3 percent in January, 1940 compared with 42.1 percent in December, 1939 and 36.2 percent in January, 1939.

Shipments tabulated according to use show that agriculture took 503 tons of quicklime and 2509 tons of hydrate; building obtained 14,365 tons of quicklime and 16,379 tons of hydrate; chemical used 71,705 tons of quicklime and 16,440 tons of hydrate; or a total of 86,573 tons of quicklime and 35,328 tons of hydrate.

## Cement Statistics

BUREAU OF MINES reports that the portland cement industry in January, 1940, produced 6,205,000 bbl., shipped 3,889,000 bbl. from the mills and had in stock at the end of the month 25,765,000 bbl. Production and shipments in January, 1940, showed an increase of 17.1 percent and a decrease of 31.0 percent, respectively as compared with January, 1939. Portland cement stocks at mills were 9.1 percent higher than a year ago. The factory value of shipments from mills in 1939, for 122,295,000 bbl., is estimated as $180,922,000 which represents an average value of $1.48 per bbl. The shipments totals for 1939 include about 3,781,000 bbl. of high early strength portland cement with an estimated mill value of $6,888,000, according to reports of producers.



In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 161 plants at the close of January, 1939, and 159 plants at the close of January, 1940.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

| | — Jan. — | | Dec. | Nov. | Oct. |
|---|---|---|---|---|---|
| | 1939 | 1940 | 1939 | 1939 | 1939 |
| The month | 24.2 | 26.5 | 43.4 | 52.2 | 57.3 |
| 12 months ended | 41.3 | 47.8 | 47.3 | 46.7 | 46.4 |

## PRICES BID
## Contracts Let

KNOXVILLE, TENN.: T.V.A. has let a contract to American Agricultural Chemical Co., New York, for approximately 15,000 gross tons of Florida rock phosphate at $1.95 per gross ton for use at the T.V.A. fertilizer plant at Muscle Shoals.

•

LITTLE ROCK, ARK.: Thirteen bids were received by U. S. Army district engineer for 117,000 bbl. of cement to be used in construction of the Nimrod dam on the Fourche la Fave River in Perry county, 60 miles northwest of Little Rock. Awarding will depend on the price bid and the freight rate to Ola, unloading point near the dam. Lehigh Portland Cement Co., shipping from Iola, Kan., bid $1.27 per bbl., Universal Atlas Cement Co., shipping from Independence, Kan., placed a bid of $1.31 per bbl.; and Lone Star Cement Corp., shipping from Harrys, Tex., bid $1.37 per bbl.

### Large Federal Contract for Agstone

CAMPBELL LIMESTONE CO., Gaffney, S. C., was listed among the companies which recently received large orders for agricultural limestone. This was one of 126 contracts valued at $3,587,046 awarded by the federal government agencies during the week ended March 2.

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COLUMBUS, OHIO: The city board of purchase awarded contracts, some of which are as follows: Marble Cliff Quarries Co., 29,000 tons of crushed limestone and dust at $1.14 per ton; American Aggregates Corp., 3000 tons gravel at $1.05 per ton; Marble Cliff Quarries Co., 6000 tons limestone asphalt sand at $1.25 per ton; Crown Building Materials Co., 14,000 tons crushed stone at 97c per ton; American Aggregates Corp., 4500 tons crushed gravel at 63c per ton; and Arrow Sand & Gravel Co., 300 cu. yd. ready-mixed concrete at $7.55 per cu. yd.

### Unusual Crushed Stone Contract With County

QUARTZITE STONE CO., Lincoln, Kans., has a contract whereby the county commission of Lincoln county will underwrite the sale of 15,000 tons of crushed rock to be produced and stock-piled on condition that the company will hire only Lincoln county men to produce the rock, giving preference to county relief men. The county guarantees the sale of the rock by January 1, 1941, or will buy the unsold amount from the company at $1 a ton. From 60 to 90 days work is in view for the company.

### Install Silica Plant

CENTRAL SILICA CO., Zanesville, Ohio, has installed a new wet mill at the Glenford plant. It is reported that the addition of the Glenford plant follows increased production which has necessitated the employment of three shifts.

### WPA Purchases of Aggregates

PURCHASES of crushed stone, sand and gravel for use on WPA projects from July, 1935, through September, 1939, totaled $144,732,000. Crushed stone purchases alone amounted to $67,762,000, while orders for sand and gravel for work relief projects toaled $76,969,000.

### Lease Island For Ohio River Dredging

OHIO RIVER SAND AND GRAVEL CO., Parkersburg, W. Va., has leased Belleville island, located in the Ohio river below Belleville, W. Va., for use as a base for dredging operations.

## OBITUARIES

CHARLES M. CADMAN, long a prominent figure in the West Coast aggregates industry, died March 23. Mr. Cadman recently resigned as president of Pacific Coast Aggregates, Inc.,

Charles M. Cadman

San Francisco, Calif., and had for years been active in the affairs of the National Sand and Gravel Association.

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FRANK J. KORNMAYER, president of the Smith-Peterson Rock & Sand Co., Reno, Nev., since 1933, died February 19 at the age of 59. P. B. Smith, vice-president, is now in active charge of the plant.

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PHILLIP C. RIEK, secretary-treasurer of the Hermann Silica Co., Hermann, Mo., died March 1 as a result of injuries sustained when struck by a 250 lb. falling rock. He was 49 years of age. Mr. Riek entered the silica sand business as an employe of the Tavern Rock Sand Co., Klondike, Mo., and in 1937 he helped organize the Hermann Silica Sand Co.

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JACOB H. BOWMAN, one of the founders and early officers of the Allentown Portland Cement Co., Allentown, Penn., died February 23 at the age of 82. Records reveal that he served as treasurer and secretary for only a brief period during the early history of the company.

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OSCAR L. DORTCH, manager of the Tennessee plants of the International Agricultural Corp., died February 18 at the age of 69. He became interested in the phosphate industry in 1906 when he and the late Thomas C. Meadows developed several small plants. In 1907 these were merged into the old Independent Phosphate Co., of which he became general manager and in 1909 when the Independent company with other plants was put into the International Agricultural Corp. he remained in active charge of operations.

•

JESSE W. BEDFORD, president and secretary of the Bedford-Nugent Co., Inc., Evansville, Ind., died February 13 at the age of 65. He was the son of the late William Bedford, who with the late James Nugent, founded the Bedford-Nugent company.

•

FRED A. BALLIN, president and founder of the Monolith Portland Cement Co., Los Angeles, Calif., in 1920 under the name of United States Potash Co., died February 5 at the age of 83. He also was an active engineer, ship builder and lumberman.

•

CHARLES E. DILLS, treasurer of the Yahola Sand and Gravel Co., Muskogee, Okla., died February 14. He had spent 30 years with this company.

•

EDWARD BLAISDELL KENDALL, operating manager of the Pacific Coast Aggregates, Inc., San Francisco, Calif., and vice-president of the

Edward Blaisdell Kendall

Transit Concrete Co., Oakland and Berkeley, Calif., died March 3 at the age of 53. He became actively interested in the industry when he joined the Niles Sand, Gravel and Rock Co. Later he was made general manager of the company and when it merged with the Coast Rock and Gravel Co. to form the Pacific Coast Aggregates, Inc., he became operating manager.

## New Incorporations

**Egyptian Concrete Co.**, Salem, Ill., has been incorporated with a capital of 2500 shares at $10 a share to deal in concrete pipe and concrete block. Incorporators are G. F. McCarty, W. P. Holt and E. H. Karrell.

**Ideal Concrete Co.**, Cleveland, Ohio, has been granted a charter. Capitalization is 250 shares, no par value and incorporators are Rusk Haverfield, Louis J. Dorai and Paul C. Hopkins, located at the Leader Building.

**The Pacific Stone Co.**, 4257 Eighth N. W., Seattle, Wash., has been incorporated for $50,000 by O. M. Moen.

**Bradley Mining Co.**, Franklin, N. C., has been incorporated. J. B. Preston is president; Christian F. Zieseniss, vice-president; and Charles Bradley, secretary and treasurer.

**Basic Industries, Inc.**, Wabash, Ind., has filed articles of incorporation. James R. Schultz is agent, while other incorporators are Walter G. Heller, A. Walter Hamilton, Robert S. Richey and Roy Bibertsine. Capital structure consists of 150 shares common stock of no par value and 100 shares 7 percent preferred stock.

**Queens Sand and Stone Co., Inc.**, Queens, N. Y., has been granted a charter. Capital is 200 shares no par value and incorporator is Abraham Sorgen, 163-18 Jamaica Ave., Jamaica, N. Y.

**E. P. Pitts Sand Corp.**, Nichols, S. C., has been granted a charter with a capital of 200 shares, no par value. Charles H. Locher is president; Elizabeth D. Pitts, vice-president; and B. G. Locher, secretary and treasurer.

**The Allied Stone Co.**, Cleveland, Ohio, has been incorporated. Capital is 1500 shares, no par value and incorporators are E. P. Chamberlain, J. H. McAuliffe, G. K. Dunn and W. E. Callahan.

## Manufacturers' News Notes

**National Industrial Advertisers Association** will hold its 18th annual conference at Hotel Statler in Detroit, September 18 to 20.

**Cleveland Rock Drill Co.**, Cleveland, Ohio, reports the passing of George H. Hall, secretary and sales manager on March 7. He also was treasurer of the Cleveland Pneumatic Tool Co. of Canada, Ltd., and was a director of the Cleveland Hardware Co.

**Joseph T. Ryerson & Son, Inc.**, Chicago, has added a new high-bay type span to its Detroit plant, increasing the floor space of this plant by over 30,000 sq. ft.

**Allis-Chalmers Mfg. Co.**, Milwaukee, Wis., announces the appointment of William C. Johnson as sales manager of the crushing and cement machinery division. Walter L. Maxson has been appointed sales manager and chief engineer of the mining machinery division.

**Leeds & Northrup Co.**, Philadelphia, Penn., reports the death of Charles Arthur White, secretary-treasurer on March 2.

**Babcock & Wilcox Tube Co.**, New York, N. Y., has appointed Joe S. Thompson district sales manager of the Chicago office.

**Productive Equipment Corp.**, Chicago, Ill., by April 1 will be located in larger manufacturing and office facilities at 2926 Lake Street, Chicago.

**R. G. LeTourneau, Inc.**, Peoria, Ill., reports that George R. Huffman, for the past three years advertising manager, resigned March 15 to return to the Pacific Coast.

**Link-Belt Co.**, Chicago, Ill., reports the passing of Robert J. Heisserman, sales engineer in Philadelphia, February 9. He had been with the company for almost 30 years.

**The Buda Co.**, Harvey, Ill., announces the appointment of Harold G. Smith as chief engineer of the Engine Division.

**Timken Roller Bearing Co.**, Canton, Ohio, has appointed William H. Richardson as assistant general sales manager. E. H. Austin will succeed him as general manager of the service-sales division. R. P. Proffitt has been appointed Chicago division manager and Jay Irwin has been named Chicago district manager of the steel and tube division.

**American Hoist & Derrick Co.**, St. Paul, Minn., has appointed John E. Carroll manager of its Chicago office. For several years he has been in charge of the company's Southwestern offices.

**The Falk Corp.**, Milwaukee, Wis., announces that Herman W. Falk, founder of the company and president since its inception, now becomes chairman of the Board and is succeeded as president by Harold S. Falk. E. P. Connell has been elected treasurer and M. A. Carpenter, secretary.

**Cummins Engine Co.**, Columbus, Ind., is erecting a new laboratory and research building representing an investment of $200,000; $75,000 for the building itself and $125,000 for the testing machinery and building engines and parts.

**Chain Belt Co.**, Milwaukee, Wis., has announced the election of J. C. Merwin as treasurer in addition to the office of vice-president, which he now holds, and the appointment of L. B. McKnight as assistant to the vice-president.

**Bucyrus-Erie Co.**, South Milwaukee, Wis., announces the appointment of J. F. Tait as district manager of their Pittsburgh sales district with offices in Pittsburgh.

**Gates Rubber Co.**, Denver, Colo., has established a warehouse at Portland, Ore., to serve the states of Oregon, Washington and Idaho. The company manufactures tires, batteries, mechanical rubber goods, industrial belting and other rubber products.

**Jackson & Church Co.**, Saginaw, Mich., announces the appointment of C. B. Dutton as representative.

**Elastic Stop Nut Corp.**, Elizabeth, N. J., has recently broken ground for a new plant on Vauxhall Road, Union, N. J., a suburb of Newark, to be used solely for the manufacture of its line of self-locking nuts.

**Lima Locomotive Works, Inc.**, Lima, Ohio, has appointed Garfield Co., Heart Bldg., San Francisco, its distributor in Northern California and Nevada.

**Hewitt Rubber Corp.**, Buffalo, N. Y., announces the appointment of Benjamin T. Moffatt as manager of the New York district.

**The Osgood Co.**, Marion, Ohio, has appointed J. W. Yeagley distributor for the southern half of Texas.

**The Hays Corp.**, Michigan City, Ind., has appointed Charles M. Chapman of Cincinnati as their representative covering southern Ohio and contiguous territory in Kentucky and Indiana.

**Link-Belt Speeder Corp.**, Chicago, Ill., has opened a New York office at 856 East 136th Street to handle the sales and service of Link-Belt Speeder shovels, draglines and cranes.

**General Electric Co.**, Schenectady, N. Y., reports that the number of stockholders on March 15 totalled 210,919, an increase of 1980 over March 17, 1939. The last previous count was made on November 24, 1939, when the total was 209,735.

**Macwhyte Co.**, Kenosha, Wis., held its employe-management-stockholder banquet on March 23. This is an annual affair for all employes and stockholders, the dinner being followed by a report covering sales and progress during the past year and by a presentation of service awards.

# Classified Advertisements

## Consider this Consolidated Equipment!

**Equipment For Sale at Former Emeralite Rock Products Co., Ely, Minnesota**

1—24x36" Jaw Crusher, all steel.
2—9x36" Reduction type Jaw Crushers, Universal.
9—Sets of CRUSHING ROLLS; 5—24x14" Allis-Chalmers Type B; 30x14" Allis-Chalmers Type B; 20x14" Sturtevant; 30x14" Colorado Iron Wks.; 36x16" Sturtevant.
70—ELECTRIC MOTORS, from 1 H.P. to 200 H.P., all 3/60/440 volts, including 2—150 H.P. Slip Ring.
1—Ingersoll-Rand AIR COMPRESSOR, 458 CFM., 100 lb. pressure, size 13x8x12, Imperial Type 10-XRB, two-stage, with inter-cooler, 79 H.P. Westinghouse 3/60/440 Motor.
1—7x6 Type ER-1 Ingersoll-Rand AIR COMPRESSOR, V-belt drive, and 15 H.P. Motor.
1—1¼ yd. OSGOOD ELECTRIC SHOVEL, 21' boom, 16' dipper handles.
3—DIRECT HEAT ROTARY DRYERS: 5x30' Buckeye and 4x30' American Process, oil burners. Also 4x40' Ruggles-Coles.
10—ELECTRIC HUMMER SCREENS, W. S. TYLER CO.; 3x5' No. 33; 4x5' No. 33; all double-deck.
4—3x6' STURTEVANT MOTO-VIBRO SCREENS, double deck, arranged two in battery, side by side.
1—4'x7' LEAHY VIB. SCREEN, double deck, excl.
1—150 Amp. Lincoln ELECTRIC WELDER, portable.
1—No. 5 Ingersoll-Rand DRILL SHARPENER.
8—BUCKET ELEVATORS, various sizes, enclosed.

Also much other equipment, thoroughly described in illustrated circular. Representative, with authority to sell, on the premises. Inquiries addressed to Consolidated Products Co., Inc., P.O. Box 189, Ely, Minn., will bring immediate quotations.

**7 Ft. Symons Cone Crusher, Fitted With Fine Bowl for Immediate Shipment at a Large Saving.**

**SOME SPECIAL ITEMS:**

2—No. 60 Raymond Imp Mills, each with 40 H.P. Motor and Separator.
1—No. 40 Raymond Imp Mill with 30 H.P. Motor and 6' Centrifugal Air Separator.
6—4'x7' Leahy Vib. Screens, 2-deck, motor driven.
2—INDIRECT HEAT ROTARY DRYERS, CHRISTIE, 70"x40', 80"x65'.
1—MARION No. 351 CRANE, gas, 4 years old. Used six months.
1—MARION No. 451 ELECTRIC SHOVEL, 3 motor type, 1¾ yd.
2—BROWNING LOCOMOTIVE CRANES No. 8-C, 25 ton capacity, 50' booms.
1—DIESEL POWER UNIT, 60 H.P., Int'l., Model PD-40, complete.
1—BUCYRUS-MONIGHAN No. 6W DIESEL DRAGLINE, 6 yd. bucket, 150' boom.
1—No. 55B BUCYRUS-ERIE DIESEL DRIVEN SHOVEL, 2¾ yd.
1—527 CFM GARDNER-DENVER COMPRESSOR, V-belt, Cat. Diesel D-13,000.
1—1300 CFM I-R PRE-2 COMPRESSOR.
1—315 CFM SULLIVAN WT-60 Cat. Diesel, D-13000.
1—CATERPILLAR RD-7 DIESEL TRACTOR with LAPLATE CHOATE BULLDOZER.

**We Have Also Purchased and Are Now Liquidating a Complete 1,000,000 Barrel Portland Cement Plant at Castalia, Ohio—60 Miles West of Cleveland**

**SOME OF THE ITEMS IN THIS PLANT ARE:**

8x125', 6x120' and 6x60' ROTARY KILNS.
1—4'6"x50' Direct Heat Rotary Dryer, double shell.
1—4x60' DIRECT HEAT ROTARY DRYER.
3—5x12' BONNOT BALL MILLS, each with 150 H.P. motor.
6—5x22', 5x22' TUBE MILLS; each with 150 H.P. slip ring motor.
1—8'x30" HARDINGE CONICAL BALL MILL, iron lined.
6—5'x27' TUBE MILLS, silex lined, with 250 H.P. slip ring motors.
1—12' dia. DRY GRINDING PAN.
100—1½ yd. two-way DUMP CARS, 36" gauge.
2—42" FULLER-LEHIGH PULVERIZERS, gear driven.
2—6'x5' TYLER HUMMER SCREENS, made up of 3x5' screens.
1—10 ton TRAVELING CRANE, 70' span, 300' lang.
1—20 ton BROWNING LOCOMOTIVE CRANE.
1—COMPLETE MACHINE SHOP.

Approx. seven miles of 40 lb. and 60 lb. RAIL.
Send to Consolidated Products Co., Inc., P.O. Box 545, Sandusky, Ohio, for detailed circular or quotations.

## CONSOLIDATED PRODUCTS CO., INC.

**15-16-17 PARK ROW** — **NEW YORK, N. Y.**

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5½ ft. Symons Cone Crusher and Motor.
10x36 Gruendler Steel Frame Jaw Crusher.
6 in. Superior McCully Reduction Gyratory.
25 ton Plymouth Gasoline Locomotive. New 1932.
¾ yd. Northwest No. 3 Gas Shovel and Dragline.
1 yd. & 1¼ yd. P. & H. Cranes and Draglines.
20"x200' Sullivan Troughed Belt Conveyor.
Telsmith No. 5 34 ft. Chain-Bucket Elevator.
80, 100, 130, 180, 240 HP. Fairbanks Morse and Atlas Diesels. Generators if required.
180 HP Fairbanks Morse Dredge type Diesel.
2—100/150 HP. Buda 6 cylinder Power Units.
1 yd. Owen type D digging clamshell bucket.
150 HP Scotch Marine type Boiler. Retubed.
25 ton Ind. Brownhoist Gasoline Loco. Crane.
All Sizes—Crushers, Shovels, Cranes, Compressors.

**MISSISSIPPI VALLEY EQUIPMENT CO.**

**515 Locust St.** — **St. Louis, Mo.**

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## RENT OR SELL

4—3-yard Rex Truck Mixers on Mack Trucks.
2—1½-yard Jaeger Truck Mixers—Ford mounted—Excellent condition.
7—4-yard Rex Truck Mixers mounted on Autocar and Mack Trucks—1937-8.
1—80 ton 2 compartment Blaw-Knox Bin.
Concrete Finishing Machine.
Rent new Diesel 315 Compressor and New Tools.

**THE JAEGER-LEMBO MACHINE CORP.**
**127-04 Northern Boulevard**
**Corona, L. I., N. Y.**
**Phone: NEwtown 9-7777**

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1—¾ yd. McMyler Gas Crawler Crane.
1—Allen Settling Tank, 6'0".
1—30' Gravel Washer, 50 Ton per hour capacity.
1—3 Drum Hoist.
1—Swintek Cutter, 50' and 1—25'.
2—Sets Mang. Steel Sand Drags 4'0" x 17' O.C.
8" Mang. Steel Sand Pump.

**BROADWAY CONSTRUCTION CO.**
**4963 Valley View Road, Rt. 10** — **Cleveland, Ohio**

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CRANE BARGAIN—NW ¾ yd., 40' boom. Loc Chicago.
Gas cat. Crane-drag., ¾ yd., 30' boom. Also Diesel.
Shovel Fronts—P&H ½, ¾, 1 & 1¼ yd. Mac. others.
Washing & Stabilizer Plants—cap. 100 yds. per hr.
Barber-Greene, Haiss & Nelson Bucket Loaders.
Barber-Greene Belt Conveyors—24"x50'-80'-90'.
Screens—A-C 2 deck 4x8. Simplicity 3 deck 3x6.
Sauerman Equmt.—Hoists, Buckets, etc., ⅛ to 5 yd.
Buckets—Prac. all types. Sizes ⅛ to 6 yds.

**JAMES WOOD**
**53 W. Jackson Boulevard** — **Chicago, Ill.**

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# CRUSHERS

**GYRATORY:** 42" McCully with 80% brand new parts. 36" Allis-C. 36" Super. McCully conv. to 16". Gates Nos. 10, 9, 8, 7½, 6, 5, 4, 3, 2, 1 (75 avail.) Telsmith Nos. 4, 5, 6, 8C, 9 & 16. Also Many Austins, Kennedys and Traylors, many sizes.

**JAW TYPE:** Traylor 60x84, 48x60, 42x48, 24x72, Superior 84x66 & 24x36. Buchanan 30x42. Farrel 60x42, 30x36, 24x36, 18x36, 12x24. Good Roads 10/36. Asmo 24x40. Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 9x30, 15x36.

**REDUC. TYPE:** Kennedy Nos. 25, 37 & 49. Telsmith 3-F & 40. Traylor 36" TZ, 8", 10", 12" Super. McCully 6" & 10". Newhouse 5, 7 & 10". Symons Cone & Disc Ty. 2' to 4'.

**ROLLS:** Allis-C. 12½x12, 36x16, 40x15, 54x24 & 72x30. Fairmount 36x60 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc., Etc.

**HAMMERMILLS:** Williams No. 1, 2, 3, 4, 6 & 9. Jeffrey 26x18 & 26x42. Day Nos. 20 & 40, Etc.

**MILLS:** Kennedy Ball 4x6, 5x6 & 5x8. Marcy 8x6 & 10x9. Hardinge 6'x2', 8'x30" & 6'x9'. Misc. Tube Mills 5' & 6' x 22'. Sturtevant Ring Roll. Raymonds, Kents, Fuller-Lehigh, Etc., Etc.

**CRUSHING PLANTS:** No. 65 Diamond. No. 22 Pioneer 8x24. 1030 Good Roads, 9x40 Austin-Western, 9x36 C.R.

**MISCELLANEOUS ITEMS**

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryers, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Slacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

**ALEXANDER T. McLEOD**
**7229 Rogers Avenue** — **CHICAGO**

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*Complete*

## WOODFORD ELECTRIC ORE HAULAGE SYSTEM

Including ten 10-cu. yd. standard gauge side-dump cars, double-motored; all necessary electrical control equipment; Motor-Generator Set; rails, etc.

**New York Trap Rock Corporation**
**230 Park Avenue**
**NEW YORK, N. Y.**

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**FOR SALE**

2—Link-Belt dewatering elevators, 20' centers, complete with all steel supporting structure and drive machinery.
2—Strut bar, revolving, scalping screens, 48" diameter, 12' long, with drive machinery.
1—Sauerman, 2 cu. yd. capacity, slackline, electric hoist with 150 H.P. motor and starting equipment.

**TERRE HAUTE GRAVEL COMPANY**
**TERRE HAUTE, INDIANA**

---

Concrete batching plant, 5 compts., 1000 yds. aggregates, 750 yds. cement, automatic weigh batcher control.
200 ton steel bin, 3 compts., weigh batcher.
225 bbl. Erie bulk cement plant, complete.
155 bbl. Fuller cement bin, electric batcher.
Blaw Knox 270 bbls. bulk cement plant, complete.
72 ton Blaw Knox steel bin, portable, 2 compts.
50 ton Blaw Knox steel bin, portable, 2 compts.
42 cu. yds. Beaumont steel bin, 2 compts.
Fuller Kinyon bulk cement unloader, portable.
Fuller C40 rotary air compressor, electric.
Gyratory crushers: K.V.S. 20, 37-B, 49; Telsmith 32, 8A, 8B; Traylor 8"; McCully 12", 8", 6".
Jaw: 6x12, 9x16, 10x20, 12x36, 13x30, 15x30, 16x32, 36x48, 48x60.
Jeffrey Type A 20" x 24" pulverizer.
Apron feeders, 18"x6', 24"x6', 48"x14', 5'x15'.
Bucket elevator, 65', chain, buckets 24"x12"x17⅝".
Revolving screens, 72"x20', 72"x18', 60"x24'.
Robbins, 4x8 double deck Gyrex vib. screen.
Telsmith 4'x10' single deck vibrating screen.
Gayco 8 ft. air separator.
Whirley, 25 tons cap., 85' boom, electric.
43-B Bucyrus Erie Diesel 2 yd. shovel.
41-B Bucyrus Erie comb. crane and shovel. Steam.
50-B Bucyrus Erie steam shovel.
Browning 10 ton crane, gas, 40' boom.
Blaw Knox single line clamshell bucket, ¾ yd.
Haiss clamshell bucket, 1½ yd. rehandling.
Barber Greene conveyor, 24"x70'.
8 Barber Greene conveyors, 24"x35', type N.
Barber Greene conveyor, 18"x80'.
4 I. R. Wagon drills, FM-2, pneumatic tires.
Caterpillar tractor, Model 20, bulldozer, gas.
I. R. Model 50 Leyner drill sharpener.
Plymouth 24 ton std. gauge gas locomotive.
Plymouth 20 ton std. gauge gas locomotive.
Vulcan 6 ton 36" gauge gas locomotive.
Vulcan 4 ton 36" gauge gas locomotive.
Dredge pumps, 6", 8", 10", 12", 16".
8"x8" cent. Lawrence pump, portable, 35HP., gas.
8"x8" cent. Barnes pump, portable, 35 HP., gas.
6"x5" Lawrence pump, 20 HP., electric.
4"x4" cent. LaBour self priming pump, 15 HP.
Ing. Rand 315-A Diesel air compressor, portable.
Sullivan WK60 315 cu. ft. portable air compressor.
DeWalt Woodworker, 16" circular saw, electric.
Wodack "D" portable hand saw, circular, electric.
Stiff leg derrick, steel, 20 tons, 97' boom.
Steam hoist, 10"x12", 2 drums, Lidgerwood.
Stiff leg derrick, steel, American, 15 tons, 90' bm., with 3 drum American 125 HP electric hoist & swinger.
Clyde 3 drum electric hoist and swinger, 75 HP.
Lidgerwood, 2 drums, swinger, gas hoist, 75 HP.
Sauerman 4 yd. dragline hoist, 150 HP, electric.
Sauerman two drum dragline hoist, 75 HP, gas.

**RICHARD P. WALSH**
**30 Church Street, New York, N. Y.**

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## LIQUIDATION

3—5'x50', 5'x40' Rotary Dryers
1—Allis Chalmers 5'x22' Compeb Mill
2—Style "D", Size 3K, 4K Gates Crushers
1—Allis Chalmers 5'x8' Steel Ball Mill
2—Jaw Crushers 22"x10", 4"x8"
5—Crushing Rolls 42"x16", 12"x24", 14" x24"
2—Tyler Hummer 3'x5', 4'x5' Screens
2—Raymond Mills, 2 Roll, 4 Roll

*Your Inquiries Solicited*

**BRILL** Equipment Corporation
193 Varick St., N. Y. C.

# CARLYLE RUBBER PRODUCTS BARGAIN BULLETIN

CARLYLE RUBBER CO., Inc., ..... 64 PARK PLACE, NEW YORK, N. Y.

BELTING FOR CONVEYORS ELEVATORS AND TRANSMISSION

★

V BELTS FOR MULTIPLE AND FRACTIONAL DRIVES

★

HOSE FOR WATER AIR SUCTION SAND SUCTION PAINT STEAM OXYGEN ACETYLENE

★

DREDGE SLEEVES ETC.

★

CARLYLE

DISTRIBUTING QUALITY RUBBER GOODS

We list below a **PARTIAL STOCK LIST of RUBBER ITEMS** which we are in position to offer at **LOW PRICES. ALL ITEMS** are **GUARANTEED FOR QUALITY AND MANUFACTURED** in **U. S. A.** We can make immediate shipments from stock.

**WIRE — PHONE — WRITE**

# ATTRACTIVE LOW PRICES

## New Heavy Duty CONVEYOR and ELEVATOR BELTING Non-Abrasive Covers

## Conveyor Belting for SAND, STONE, ROCK, CEMENT, CINDERS, ETC.

| Quantity | Width | Ply | Top Cover | Bottom Cover | Type |
|---|---|---|---|---|---|
| 668 Ft. | 36" | 6 | 1/8" | 1/16" | Conveyor |
| 660 Ft. | 30" | 6 | 1/8" | 1/16" | Conveyor |
| 245 Ft. | 26" | 5 | 1/8" | 1/16" | Conveyor |
| 1906 Ft. | 24" | 5 | 1/8" | 1/32" | Conveyor |
| 298 Ft. | 24" | 4 | 1/8" | 1/16" | Conveyor |
| 370 Ft. | 22" | 8 | 1/16" | 1/16" | Elevator |
| 296 Ft. | 22" | 8 | Friction | | Elevator |
| 1455 Ft. | 20" | 5 | 1/8" | 1/32" | Conveyor |
| 403 Ft. | 20" | 4 | 1/8" | 1/16" | Conveyor |
| 60 Ft. | 18" | 8 | 1/4" | 1/16" | Elevator |
| 126 Ft. | 18" | 5 | 1/8" | 1/16" | Conveyor |
| 1738 Ft. | 18" | 4 | 1/8" | 1/32" | Conveyor |
| 226 Ft. | 18" | 4 | 1/16" | 1/16" | Conveyor |
| 288 Ft. | 18" | 6 | 1/8" | 1/16" | Elevator |
| 1456 Ft. | 16" | 4 | 1/8" | 1/32" | Conveyor |
| 554 Ft. | 16" | 4 | 3/32" | 1/32" | Conveyor |
| 738 Ft. | 14" | 4 | 3/32" | 1/32" | Conveyor |
| 288 Ft. | 14" | 4 | 1/8" | 1/16" | Conveyor |
| 110 Ft. | 12" | 8 | 1/8" | 1/16" | Elevator |
| 226 Ft. | 10" | 6 | 1/16" | 1/16" | Elevator |
| 330 Ft. | 24" | 8 | 1/8" | 1/16" | (Used Elev.) |
| 310 Ft. | 60" | 8 | 1/8" | 1/16" | (Used Con.) |

We will cut any of the above Rolls: Advise length, width and ply for Prices.

**MANY OTHER SIZES IN STOCK FOR IMMEDIATE SHIPMENT**

## NEW RUBBER TRANSMISSION BELTING HEAVY-DUTY

**TRANSMISSION BELTING MADE OF SILVER DUCK FOR HEAVY DRIVES** on Crushers, Rolls, Pumps, Screens, Kilns, Mills, Shakers, Air Compressors, Breakers, All Heavy Drives.

**ANY LENGTHS DESIRED** — **CAN ALSO FURNISH ENDLESS**

**WIDTHS AND PLY IN STOCK**

| Width | Ply | Width | Ply | Width | Ply | Width | Ply | Width | Ply | Width | Ply |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3" | 4 | 5" | 4 | 8" | 5 | 12" | 5 | 14" | 6 | 20" | 6 |
| 3" | 5 | 5" | 5 | 8" | 6 | 12" | 6 | 16" | 6 | 20" | 8 |
| 4" | 4 | 6" | 5 | 10" | 5 | 12" | 7 | 16" | 8 | 22" | 8 |
| 4" | 5 | 6" | 6 | 10" | 6 | 12" | 8 | 18" | 6 | 24" | 6 |

## "V" SHAPED BELTS

**FOR MULTIPLE AND GANG DRIVES**

**ALL SIZES IN STOCK FOR IMMEDIATE SHIPMENT**

## RUBBER HOSE

### AIR HOSE

**for Compressors, Drills, Breakers, etc.**

| Size | Lengths |
|---|---|
| 3/8" | 25'-50' |
| 1/2" | 25'-50' |
| 3/4" | 25'-50' |
| 1 " | 25'-50' |
| 1 1/2" | 25'-50' |
| 2 " | 25'-50' |
| 3 " | 25'-50' |

All types of Couplings furnished

### SUCTION HOSE

**(Water)**

**Heavy-Duty**

| Size | Lengths |
|---|---|
| 1 1/2" | 15'-20'-25' |
| 2 " | 15'-20'-25' |
| 2 1/2" | 15'-20' |
| 3 " | 15'-20' |
| 4 " | 15'-20'-25' |
| 6 " | 10'-15'-25' |
| 8 " | 15'-20'-25' |

Nipples or Couplings Attached

### MISCELLANEOUS TYPES OF HOSE, ETC.

2 1/2" FIRE HOSE (NEW AND USED)
3 1/2" DISCHARGE HOSE (NEW AND USED)
3" DISCHARGE HOSE (NEW)
DREDGE SLEEVES (NEW—ALL SIZES)
OXYGEN AND ACETYLENE HOSE (NEW)
SAND SUCTION HOSE (NEW—ALL SIZES)
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1—Page, Model No. 411 Diesel crawler dragline, 70' boom, 2 yd. bucket.

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1—Link-Belt K-42, combination shovel, crane and trench hoe, Serial No. 1265, 1¼ yd. shovel front, 60' crane boom.

3—Northwest, Model 105, Serial No. 1645-2053 & No. 1522 40' boom, 1 yd. bucket.

1—Link-Belt, K-1, Serial No. 1024, 50' boom, 1 yd. bucket.

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Buchanan Jaw Crushers: 18 x 36, 15 x 30.
Traylor Jaw Crushers: 28 x 36.
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1020 Good Roads Roller Bearing Jaw Crusher.
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2'0" x 4'0" single deck DIAMOND vibrating screen.
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9—50 ton std. ga. heavy duty flat cars.

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400 Barrel Butler Portable Steel Cement Bin with Fuller automatic batcher, push button control.

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Farrel 24x36 Type B Jaw Crusher.
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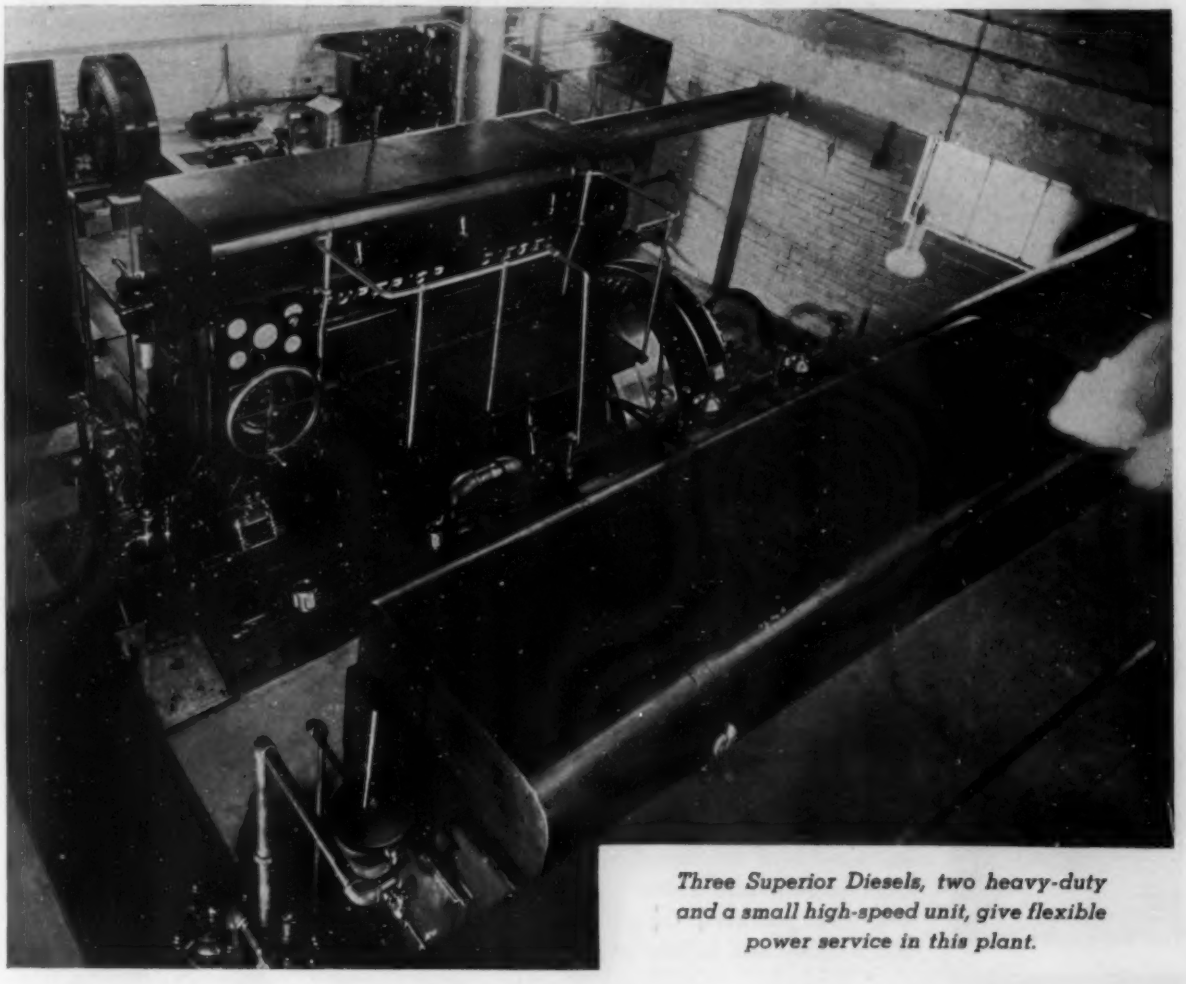

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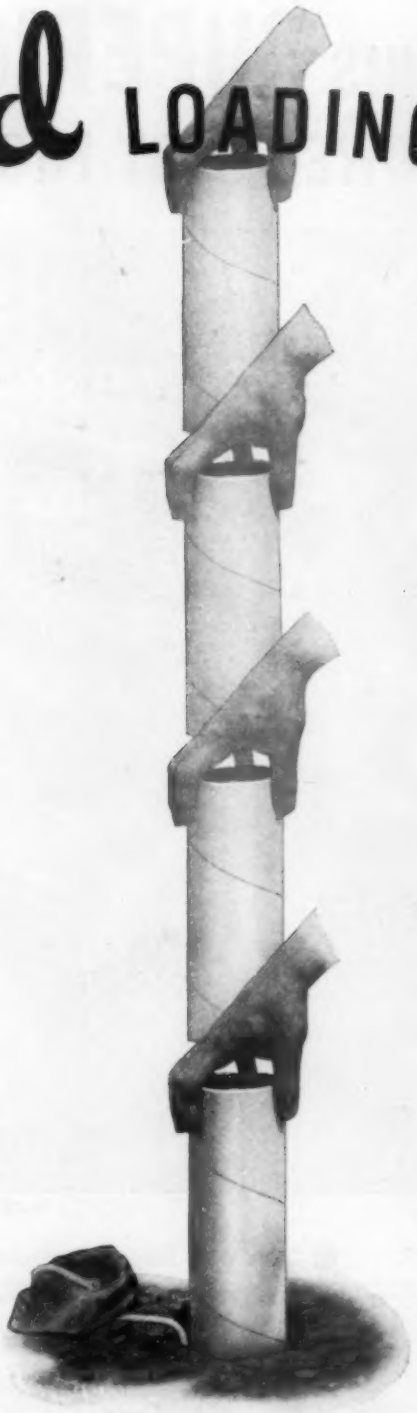

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